The AMERICAN HOROLOGIST

OFFICIAL NATIONAL PUBLICATION

Vol. III SEPTEMBER, 1938 No. 9

THE AMERICAN HOROLOGIST

Official National Publication of the United Horological Association of America, Inc., and Its Affiliates

Published under the direction of the U. H. A. of A., Inc., Executive and Technical Boards by the Roberts Publishing Co.

To inculcate the principles of the U. H. A. of A., fraternal and commercial advancement; to promote the welfare and enhance the betterment of its members; to cultivate good fellowship and a higher degree of knowledge in Horology; to be sent free monthly to all members. National membership, $2.00 per year. Make application to nearest secretary or representative. Addresses can be secured in the NATIONAL AND LOCAL INFORMATION column in this issue.

Address all communications to THE AMERICAN HOROLOGIST, 3226 East Colfax Avenue, Denver, Colorado.

Editor and Manager

ORVILLE R. HAGANS
Denver, Colorado

Associate Editors

FRANK FOEGLER
Cincinnati, Ohio

THOMAS J. FAGAN
Boston, Mass.

OTTO R. SABRO
Portland, Oregon

Technical Editor

W. H. SAMELIUS
Director Elgin Watchmakers' College.

Assistants

ENTIRE TECHNICAL BOARD

All contributions and advertising material must be received not later than the 20th of the month. Advertising rates upon request.

Nothing that appears in THE AMERICAN HOROLOGIST may be reprinted without special permission.

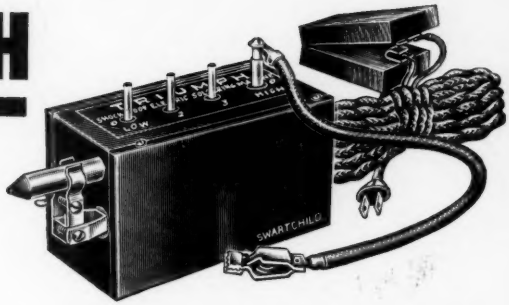
Copyright - 1938 by Orville R. Hagans.

Contents

	Page
Protective Watchmakers Legislation	5
Notes on Repair of Synchronous Motored Clocks, By Alvan Fisher	7
How Trade Names Make the Jeweler Safe, By Charles R. Rosenberg, Jr.	16
German Ultra-Modern Clock, By Alexander Ball	18
New Technical Board Member	19
New York State Watchmakers Association, By R. A. Gutfrucht	20
Tenn. Watchmakers & Jlrs. Assn., By R. F. Langreck	22
Laying Out and Drafting and Escapement, By D. L. Thompson	23
Radio Clock is Kept on Time by Signals Varying a Beam	30
Rhode Island Horological Assn., By Theodore E. Vaine	31
Master Watchmakers Assn. of Colo	32
Colorado Jewelers Assn	33
War "Education" for Industry Near	33
Cincinnati Guild, By J. A. H. Voss	34
St. Paul Watchmakers Guild, By Karl G. Neid	35
Book Reviews	36
A Difference of Opinion, By Hugh M. Owens	37
Do You Know, By W. H. Samelius	39
Columbus Watchmakers Guild, By L. B. Allen	40
Sioux City Horological Guild, By C. M. Hewitt	40
Tenn. Auxiliary Guild No. 1, By Mrs. Ralph Langreck	41
Trade News	41
Friction Jeweling	44

TRIUMPH

Reg. U. S. Pat. Off. No. 352,715



Electric Soldering Machine

•

Produce Factory Finished Jobs in Your Own Shop

•

For
JEWELER,
WATCHMAKER
or OPTICIAN

•

SWARTCHILD & COMPANY

World's Largest Watchmakers' and Jewelers' Supply House

NEW YORK CHICAGO DALLAS
BOSTON ATLANTA

Here is a soldering machine, suitably designed to give the utmost in service to jeweler, watchmaker or optician.

IT PAYS BIG DIVIDENDS

Install it in your shop and immediately it will start earning money for you. Now the most delicate and intricate jobs can be "factory finished" in your own shop. Anyone can learn to use it efficiently.

HAS FOUR HEAT VARIATIONS

The four heat units provide a proper heat for every type of soldering from tiny chain links to heavy soldered joints. TRIUMPH is so constructed that the heat emanates from the carbon instantaneously when pressure is placed on the foot pedal. This super-instant-concentrated heat is the secret success of quality soldering jobs. And this superior feature is available to you in a unit that is now sold at a very low price.

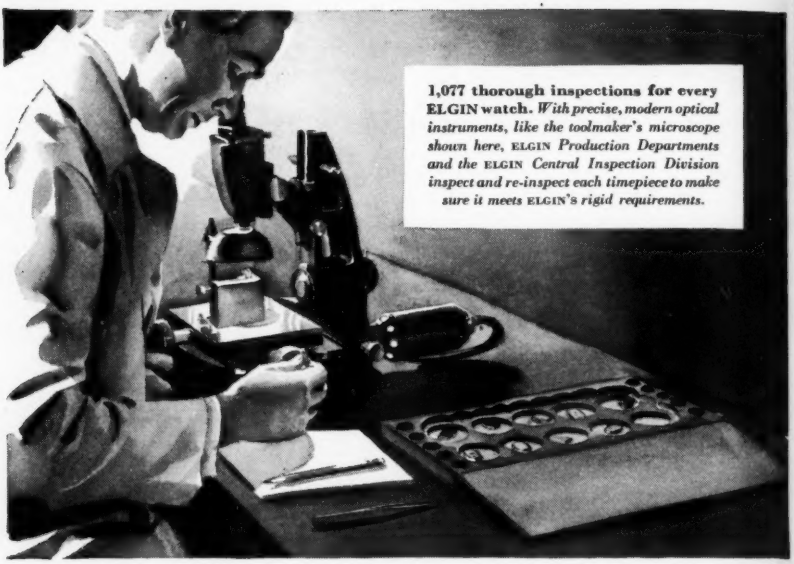
ABSOLUTELY SHOCKPROOF

The TRIUMPH model includes all important modern features. It is absolutely shockproof. It is small, convenient to move, operates on A.C. 60 cycle, 110 volt, and is supplied complete with all accessories.

$1.25 PER MONTH BUYS IT

You can place this modern equipment in your store for as little as $1.25 per month for 10 months when purchased on our convenient monthly payment plan. Order yours today.

No. 533084. TRIUMPH SOLDERING MACHINE complete with carbons, contact cord and clip, adjustable carbon holder, extension cord, plug, foot pedal and directions..... **$12.50**



1,077 thorough inspections for every ELGIN watch. *With precise, modern optical instruments, like the toolmaker's microscope shown here,* ELGIN *Production Departments and the* ELGIN *Central Inspection Division inspect and re-inspect each timepiece to make sure it meets* ELGIN'S *rigid requirements.*

YEARS AHEAD IN TECHNICAL DESIGN

—because Elgin equipment is the world's finest

ELGIN'S *traditional craftsmanship, perfected through 74 years, now aided by scientific instruments heretofore unknown in watchmaking!*

Precision instruments that weigh quantities as small as 4/10,000,000 of an ounce—much less than a pencil mark. Gauges accurate to 2/1,000,000 of an inch. These are examples of the special equipment that is enabling ELGIN'S famous American craftsmen to produce watches that are whole years ahead!

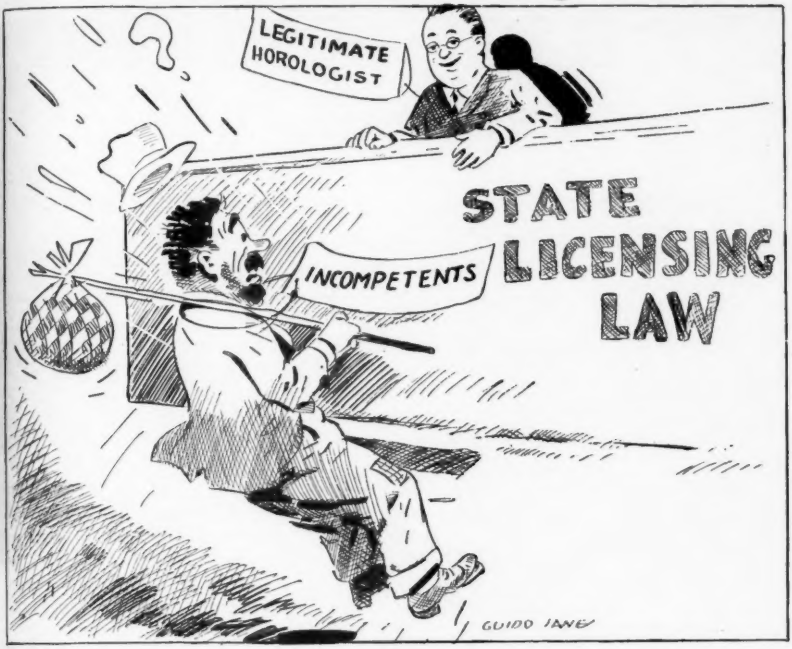
ELGIN'S world leadership is well shown by the handsome new 21-jewel Lord Elgins and graceful 19-jewel Lady Elgins. Tiny parts are accurate to 1/10,000 of an inch—less than 1/14 the diameter of the average human hair. "Drive" wheels are covered with 24 k. gold. Dials of sterling silver. Plates are protected by rhodium, a metal more than four times as costly as platinum.

Quality jewelers are exhibiting these newest ELGIN'S now. Each is timed to the standard of the stars by ELGIN'S own observatory. Lord Elgins from $50; Lady Elgins from $47.50; other fine ELGIN values from $16.50.

★ ELGIN ★

MADE BY AMERICAN CRAFTSMEN IN THE WORLD'S LARGEST FINE-WATCH FACTORY

Protective Watchmakers' Legislation



What has been a dream of most legitimate horologists and jewelers for many years is now becoming a reality.

The entire industry is conscious of this forceful movement which is sponsored by the Horological and Jewelry Associations' interests.

U. H. A. of A. representing nationally the greatest number of organized Horologist Associations has sponsored this movement and aided in this work. The Wisconsin Association, which is a definite unit of U. H. A. of A. and the only successful state to date in realizing the actual benefits of Watchmakers' Legislation, is proof of what can be done.

Wherever our associations are, they are sponsoring legislative acts and next year a surprising number of bills will be presented, many of which will pass.

These legislative walls present a serious problem, not only to the states without protection, but to the states who erect them. The laws must be enforced; a policing organization is necessary and that must be a state association with strength in ethical membership.

The unprotected, inactive states will be confronted with an influx of undesirable element which will undermine stability of prices and wages. This being the case, and you know it will be true, no state can afford to turn a deaf ear to the cause. You should become organized at once and, if organized, should start your work along legislative and educational lines.

If you wish aid, drop a line to National Headquarters as U. H. A. of A. is in a definite position to help you organize your complete program of organization, education, fraternalism, and legal problems.

(The Jewelers' Circular Keystone is conducting a Legislative Survey to ascertain action and interest along all jewelry and watchmaking lines. We urge those associations who were contacted for information to act speedily and return the questionnaire at once. Results will appear in their publication at an early date.)

L & B Ring Sizer No. 10

A Perfect Ring Sizer

Enables the Jeweler to Make Immediate Deliveries Without Carrying An Excess Stock of Rings

No Store or Shop Complete Without This Tool

This fine efficient tool will roll white gold rings an average of a fullsize—yellow gold, silver and platinum can be rolled up to three sizes.

Furnished with 5 dies to fit the 12 most used shanks, including the new knife edge, square and extra thin. Single stone rings can be sized without using a grooved mandrel.

Price with 5 Dies **$15.00**
Tempered Mandrel **3.00**

ORDER FROM YOUR JOBBER

HAMMEL, RIGLANDER & CO., INC.

WHOLESALE DISTRIBUTORS

209-211 West 14th Street **New York, N. Y.**

Notes on Repair of Synchronous Motored Clocks

EDITOR'S NOTE: With this article we continue the subject of electric clocks.

ARTICLE NO. 5

By MR. ALVAN FISHER,
Commercial Engineer, Warren Telechron Company

THE development of the electric clock, driven by a self-starting synchronous motor, has resulted in a new era in timekeeping wherein accurate time can be obtained by merely connecting the clock to an alternating current source of power. This revolution in the art of timekeeping has been made possible through the development of not only the small, self-starting, synchronous motor that is installed in each Telechron Clock, but also of the Telechron Master Clock, which is located in the power station. Both the Telechron Master Clock and synchronous motor were developed and patented by Mr. H. E. Warren, now president of the Warren Telechron Company, after many years of patient, pioneering effort.

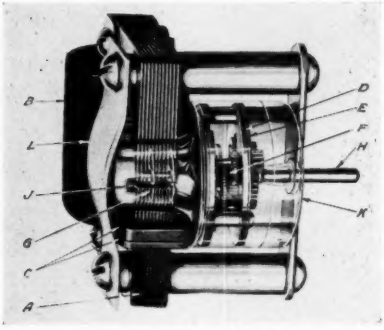
The construction and design of a synchronous motor are such that its speed will constantly remain in step with the speed of the generator that furnishes its power. This is accomplished by means of the pulses of alternating current that are generated at the rate of 120 a second on a 60 cycle system. Thus, if the generators in the power station of a public utility system can be operated so that they will constantly send out the same number of pulses for each second of each day of the year, a synchronous motor connected to the system will operate at a constant rate of speed. Connect the shaft of the motor to a pair of clock hands, through a properly designed gear train, and the combination will result in a very accurate timekeeper. This is the principle of a Telechron Clock—a small motor, running at constant speed, that is driving a pair of clock hands at the proper rate to insure accurate timekeeping.

It then becomes necessary to control the generators in the power station so that they will operate at the correct average speed at all times and thus supply the clock motors with the proper number of impulses a second. This is accomplished through the use of the Telechron Master Clock which is universally accepted by power companies throughout the world as the most effective means available for maintaining a correct average frequency.

The Telechron Master Clock provides a simple, accurate and effective means of comparing frequency time with correct time so that the station operator can tell at a glance whether or not it will be necessary to change the speed of the generators. In the Type "A" Master Clock (Fig. 1), this indication is obtained through the use of two hands concentrically mounted upon the same dial. One hand is driven by a motor-wound spring movement controlled by an accurate 60 beat pendulum with a Graham dead-beat escapement. This pendulum can be very accurately regulated by both mechanical and electrical means and, in addition, can be electrically set without stopping or touching the mechanism. To insure the necessary accuracy of timing, each power company frequently checks the pendulum time with the daily radio time signals broadcast from the U. S. Naval Observatory. The second operating hand is driven by a Telechron Motor and the speed of this motor is a measure of the speed of all the clock motors connected in the system and thus is an indication of their time.

If the two hands of the Master Clock are set with one directly over the other and if the speed of the generators is controlled so that the two hands are continuously in step with each other, it is evident that all motor-driven electric clocks will also indicate the same time as the pendulum hand and thus the correct time. If there should be a change

in the generator speed from the correct average value, the motor hand will move away from the pendulum hand and the error will become apparent before the time has varied more than a few seconds. It then becomes necessary for the station operator to adjust the generator speed so as to bring the two hands back into coincidence again. Such an accurate and continuous speed control is not at all difficult to maintain, as indicated by the fact that over 24,000,000 meters through the United States alone are now

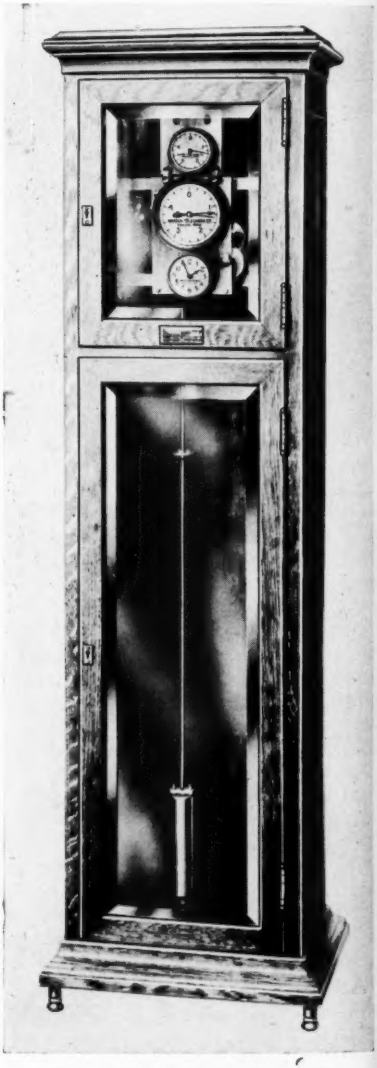


Phantom View of the Construction of a Telechron Type B-2 Motor.

served with an electric time service that should never vary from observatory time by more than a few seconds!

The Telechron Motor itself is a very compact and ingenious mechanism that transforms the frequency pulsations into mechanical rotation in such a manner that the motor speed is in exact synchronism with the generator speed. There are several types and sizes of Telechron Motors, each of which is designed for a certain specific field of operation. In general, each type of motor can be arranged to operate on any particular commercial voltage and frequency with any one of a number of different shaft speeds. Although these motors vary in mechanical details, electrical input and torque output, their basic operating principles are identical.

Figure 2 shows a phantom view of a Telechron Type B-2 motor that is widely used in certain types of Telechron Clocks as well as many industrial devices such as recording meters of all types, time switches, range timers, control devices, etc. The motor consists of a small bi-polar field (A) that is mag-



Telechron Type A Master Clock for Use in a Power Station to Obtain Accurate Regulated Frequency.

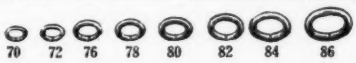
netically energized by a coil (B) drawing power from a single phase alternating current circuit. Each field pole is split and has a number of copper shading coils (C) upon one of its arms. Located in the field and, with a relatively large air gap, is a combination of rotor rings (G) with the number depending upon the type of motor. These rotor rings are made of thin, hardened steel with a high magnetic remanence. Because of its characteristics, the rotor will revolve at synchronous speed which is reduced to the speed required at the terminal shaft (H) by means of a train of gears and pinions (F).

The rotor of the motor starts from rest and attains synchronous speed almost instantly under rated load because of the magnetic remanence in the ring rotors. The initial starting torque is due to the fact that the poles, induced in the rings by the rotating magnetic lines of the field, persist locally during part of an alternation, after the inducing magnetism has advanced, and, by ordinary magnetic attraction, tend to follow the field. The following magnetic reversal overcomes these local poles in the rotor rings and sets up new ones but the rings in the meantime, have moved in the direction of the new poles. At first, there is a progressive shifting of poles about the circumference of the rings. As the speed increases, the starting torque continues strong until actual synchronism is reached, at which time the local poles in the rings remain in step with the rotating field and no longer shift progressively through the mass of the rings. In order for this action to take place, it is necessary to proportion and design the field, air gap, and rotor so as to maintain certain very definite relations between them, especially with regard to the distribution and intensity of the magnetic flux. Otherwise, the magnetic poles of the rotor might shift at synchronous speed and cause the rotor to slip.

Newall
Acid Test
Jump Ring
Assortments

No. 77A—Yellow Acid Test, 1 gross assorted.
Per box **$0.85**

No. 677A—White Acid Test. 1 gross assorted.
Per box **$0.85**



No. 93A—Yellow Acid Test. 1 gross assorted.
Per box **$0.85**

Round and Oval

The jump rings in these assortments are a high grade acid resisting jump ring. They contain 50% more gold than the ordinary plated findings and have much longer wearing qualities.

Watch Material Supply Houses Have Them

The Newall Mfg. Co.

29 E. Madison St.
CHICAGO

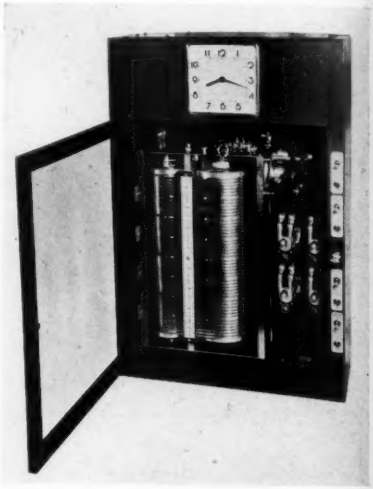
The purpose of the shading coils is to give a rotating tendency to the magnetic field by causing the flux, through the pole arms with the shading coils, to lag behind the flux through the unshaded arms. This effect causes the rotor to revolve for its polarized section tends to follow the resulting rotating flux.

The motor casing (K) is made of a thin brass shell and cap which are tightly sealed together after the assembled motor gear train has been inserted. A definite amount of lubricating oil, far in excess of that actually needed, is also placed in the case before the assembly is completed. In this manner, the rotating parts are totally enclosed and protected from all dirt, dust, and other foreign matter.

The neck of the motor casing containing the rotors is inserted tightly into the laminated field structure (A). The field is built up of thin electrical steel laminations which are firmly strapped together. The type of laminations in the field structure varies with the frequency. The turns in the field coil (B) are arranged in number and size of wire so that a constant magnetizing effect may be obtained for various voltages and frequencies.

The various bearings of the gear train are ingeniously lubricated through the capillary action of the oil within the motor casing working itself up between the inner bearing plate (D) and the outer face plate (E) which form each side of the reduction unit. A special oil is used as a lubricant which will give satisfactory operation between 0° and 100° F. Motors, which will be operating at sustained temperatures outside of this range, can be lubricated with other grades of oil to meet the special operating conditions.

In the Type B-2 motor, the speed at the terminal shaft of the motor is one revolution per minute or the speed of the sweep seconds hand. Thus, it is only necessary to attach a long shank to the sweep seconds hand and to insert the former into the hollow terminal shaft of the motor in order to obtain the proper speed of rotation. The remainder of a Telechron clock movement consists of a series of gears and pinions designed to rotate the minute hand once per hour and the hour hand once in twelve hours. A slip frfiction is also provided which permits the hour and minute hand to be set from the front or the back of the



Telechron Multiple Circuit Program Instrument for Controlling a Number of Signal Circuits—Each With Its Own Signal Program.

movement or by means of a pendant setting rod depending upon the style of clock. The hands may be set without disturbing the operation of the motor in any way.

The interruption indicator consists of a shaft with a bi-colored disk, or flag, at one end and an armature mounted so as to be over the motor field. The flag is divided into two sectors—one colored to match the dial and the other colored red. The indicator armature is arranged so that, when the flag is turned to match the dial the armature will be held in place by the magnetic attraction of the motor field so long as it is supplied with power. When the power fails, the magnetic effect of the field ceases and the overbalanced end of the armature causes the shaft to turn and the flag

FOR YOUR PROTECTION

DO NOT ACCEPT

LONGINES OR WITTNAUER

MATERIAL FOR GENUINE UNLESS YOU RECEIVE IT IN THESE FACTORY SEALED ENVELOPES

FRONT

For the Jeweler's Protection, genuine Wittnauer materials come only in factory-sealed envelopes.
DO NOT ACCEPT IF SEAL IS BROKEN

BACK

ALSO

BENRUS AND CENTRAL

MATERIAL, WHICH IS PACKED IN THESE FACTORY SEALED ENVELOPES

FRONT

All genuine Benrus material is packed in factory sealed envelopes for your protection against imitation material
Be Sure Seal is Unbroken.

BACK

FRONT

All genuine Central material is packed in factory sealed envelopes for your protection against imitation material
Be Sure Seal is Unbroken.

BACK

Every Part is packed in the above manner. When ordering advise your jobber that you want this material in Genuine Factory-Sealed Envelopes.

ORDER FROM YOUR MATERIAL JOBBER

M. J. LAMPERT & SONS, INC.

37 Maiden Lane **New York City**

Exclusive Wholesaler Distributors

Important—If your material dealer fails to supply genuine material—write us for the names of jobbers in your vicinity who carry complete lines of LONGINES—WITTNAUER—BENRUS—CENTRAL Material in genuine factory-sealed envelopes.

to show red in the dial. This indication serves a valuable purpose for it will indicate red at the beginning of an interruption in power at which time, of course, the motor will stop. At the end of an interruption, the motor will again begin to operate but the indicator will still show red until manually reset. Thus, the clock owner knows that the clock time is not correct even though the clock is in operation. The hands can then be readily checked by comparison with a watch the radio time announcements; or any of the accurate time facilities now available. Today, power interruptions are most infrequent in urban sections and even then are generally of only a few seconds' duration.

Although Telechron Clocks can be installed individually or in groups, directly connected to a source of regulated a-c power, group installations are usually provided with a common wiring system and controlled from a central point by means of automatic or manual resetting devices. The simplicity of a centrally controlled Telechron clock system recommends its use in schools, hospitals, industrial plants, public and private office buildings, hotels, etc. Installations involving 1000 or more clocks have been in operation for several years.

The purpose of the central control equipment is to permit a localized control over a group of clocks so as to permit stopping or speeding up as may be necessary because of daylight saving time or power interruptions. In no sense does the central control equipment have any control over the timekeeping rate of the clock system under normal operating conditions.

Of the various types of sysems in use, the most common are the three wire, dual motor system or the two wire, double frequency system. The former system, which is ordinarily used in smaller installations, utilizes a 3 wire distribution system and a dual motor movement at each clock. The third wire and second motor are energized only during resetting periods when the combination of the second motor and an epicyclic gear train in the movement permits operation of the hands at an accelerated rate. The two wire system utilizes only one motor at each clock upon which, during the resetting operation, double frequency at double voltage is impressed by means

The Largest, Four-Dial, Gas-Tube Illuminated Clock in the World. Williamsburg Savings Bank, Brooklyn, New York.

of a specially designed motor generator set. Thus, the clocks operate at twice their normal rate under the resetting conditions. The number and type of clocks in the installation generally control the type of resetting system that is used.

With manual control, the operation of a switch either energizes the third wire

or starts, through a heavy duty starter, the motor generator for setting the clocks ahead. With automatic control, this switching can be done automatically, after an interruption in the power supply, so as to bring the clocks up to the correct time. Under such conditions, an accurate, marine type, spring movement measures the duration of the power interruption and permits resetting until the clocks again indicate the correct time. In both the manual and automatic systems, a switch is provided to stop the clocks as when changing from daylight saving to standard time.

It is sometimes imperative that certain installations have continuous timekeeping even though the possibilities of a power interruption are rather remote. In such a case, central control equipment can be supplied to automatically energize the clocks by converting direct current into alternating current for use during a power interruption. Normally, all clocks operate from the A. C. source of power. When an interruption occurs, the central control device automatically starts a rotary converter and switches the clock system to the A. C. side of the converter. As the converter comes up to speed practically instantaneously, there is no perceptible time loss. Also as the converter is equipped with an accurately set speed governor, there is no noticeable timing loss during such an operating period. When the normal A. C. supply is resumed, the converter is automatically shut down and the clock system is transferred to a normal source of power. When batteries are used to supply the converter, battery charging equipment automatically brings them back to their normal, stand-by condition.

There are many styles and sizes of Telecron Clocks that may be furnished for individual or system use. These range from small household clocks with 3 inch dials to large, illuminated dial, tower or sign clocks 50 feet or more in diameter. All of these clocks may be used on one or the other of the various central control systems.

The large tower and sign clocks are of particular interest in that there seems to be no limit to their size and application. Such clocks are furnished with an individual, self-contained movement for each dial with resultant savings in space and installation costs. The movement, of various sizes to meet the installation conditions, consists of a compact, sturdy, totally-enclosed gear assembly mounted between heavy steel plates together with the necessary bearings, minute hand shaft, hour hand sleeve, etc. A small, direct-reading, pilot dial and a manual setting knob on the back of the movements permit easy and accurate setting of the hands without the latter being visible. As the minute-hand shaft and

Incomparable
Watch Case Repairing
OUR WORK COSTS NO MORE THAN ORDINARY WORK
BECKER-HECKMAN CO.
29 E. Madison St. CHICAGO, ILL.

LEFLER IMPROVED BALANCE CHUCK

Pivot hole in HARDENED STEEL SETTING — Accurately Centered — Worked to Extreme Thinness—2 to 3 thousandths.

INDISPENSABLE FOR ALL CLASSES OF PIVOT WORK, Straightening, Polishing, Etc.

The Hard Steel Center makes it possible to produce NECESSARY THINNESS, ACCURACY and DURABILITY of Pivot Hole.

Made in both regular and Bracelet sizes for all standard lathes. The pair covers all range of work from smallest baguette to 18 sizes.

PRICE, $5.75 EACH « » SATISFACTION GUARANTEED

When ordering, state make of lathe and whether Bracelet, Regular or both chucks are wanted.

The Lefler Watch Repair & Tool Co.

808 WINDOM STREET PEORIA, ILLINOIS

hour-hand sleeve are integral parts of the movement, no careful alignments or adjustments are necessary. Because of the simplicity, accuracy, and accessibility, the original installation and future adjustments can be made with a minimum of effort.

Large clock dials may be illuminated in various ways; by lamps mounted behind translucent glass dials, by floodlighting, or by the use of incandescent lamps or gas tubing on the hands and numerals. The use of colored gas tubing gives effective, spectacular and practical results. When illumination of the hands is involved, the necessary collector rings and brushes for transmitting the power to the moving parts are built into the movement, while arrangements are made for mounting the necessary transformers in the tail of each hand. Figures 3 and 4 show two applications of large Telechron Clocks with gas tube illumination of the dial and hands.

Gas-tube illuminated clocks are also available in smaller sizes ranging from 18 to 36-inch dials. Such clocks can be procured for both indoor and outdoor use with tubing of various colors. In such clocks, a gas tube is mounted between the crystal and dial and arranged to give a striking and effective illumination of the entire dial. If desired, an additional tubing, of the same or contrasting color, may be mounted outside the case. As the hands are designed to give a maximum visibility, such clocks are widely used on outdoor signs, in filling stations on the front of stores, etc., with very effective results.

In addition to the many sizes and styles of clocks, Telechron Motors are installed in many forms of devices in which time is a factor. One type of device, the program instrument, is of particular interest for schools, colleges, factories, and offices where scheduled periods of operation are controlled through the use of signals. The Telechron single circuit program instrument, shown in Figure 5, permits signal operation at any five-minute interval throughout each day with a calendar mechanism to cut out the signals on any desired day such as Saturdays and Sundays. The signal operation is controlled by a disk in which notches are cut at the desired time of operation. Disks are readily interchangeable and the duration of the signal is adjustable. Either A.C. or D.C. or high or low voltage signals may be used as the circuit closure is accomplished through the use of a mercury-tube relay. External switches permit a momentary manual control of the signals or a silencing of all signals. This program instrument is self-contained in a steel cabinet and is of particular interest to factories, small schools, etc., where a fixed cycle of operation is existent.

Where more than one signaling program is required, a multiple circuit program instrument, shown in Figure 6, has been developed. This device can be furnished to operate 2, 4, or 6 circuits

(Continued on page 19)

FULCRUM OIL

Will Not Gum, Will Not Evaporate and Is Absolutely Free From Acids of All Kinds

IT IS A PERFECT LUBRICANT FOR WATCHES AND CLOCKS

All Material Jobbers Will Supply It

A post card request will bring you an instructive booklet, "Watch Lubricants, Exposing Their Secrets, Explaining Their Use."

FULCRUM OIL CO. **Franklin, Pa.**

"DO IT RIGHT"

the first time with

Genuine

HAMILTON WATCH MATERIALS

A FEW CENTS SAVING can't outweigh the greater loss that results from customer dissatisfaction with a sloppy repair job. The cut-rate watchmaker, with his inferior materials, has to depend on a steady stream of "one-time" customers. The watchmaker who uses genuine Hamilton materials for Hamilton Watches can be confident of repeat orders from old customers as well as new business from watch owners who have learned of his craftsmanship.

It stands to reason that no one can be more vitally interesetd in the performance of Hamilton Watches than the makers. It stands to reason that no one is in a better position than the makers to furnish materials for the repair of Hamilton Watches. "Do it right" the first time—use genuine Hamilton materials and preserve that in-built stability and traditional accuracy which have distinguished Hamilton Watches since 1893.

Your Hamilton Material Wholesaler is equipped to fill your requirements promptly.

HAMILTON WATCH CO., LANCASTER, PA.

How Trade Names Make The Jeweler Safe

By CHARLES R. ROSENBERG, JR.

ARE jewelers overlooking one of their most important advantages in selling trade-marked goods? Consumer acceptance, quick turnover, assurance of quality standards—those features of branded items are every day commonplaces in jewelry merchandising; yet in addition to all these advantages, there's another and perhaps more significant one that jewelers either haven't heard about or at least haven't appreciated. It's this:

The law backs and protects the jeweler who handles trade-marked goods! And it works both ways, for the jeweler who sells nameless merchandise is liable to find the law against him instead of in his favor.

The Uniform Sales Act, which is in effect in a majority of the states, has this to say:

"Where the buyer, expressly or by implication, makes known to the seller the particular purpose for which the goods are required, and it appears that the buyer relies on the seller's skill or judgment, there is an implied warranty that the goods shall be reasonably fit for such purpose."

But further on in the same Act there is this clause:

"In the case of a contract to sell or a sale of a specified article under its patent or trade-name, there is no implied warranty as to its fitness for any particular purpose."

An "implied warranty" of fitness of merchandise for a particular purpose is, virtually, an unspoken guarantee that if the merchandise does not give a satisfactory performance in the use for which the customer bought it, the seller may be held legally and financially responsible for the damage suffered by the customer through the failure of the merchandise.

Such a liability on the part of the jeweler arises under the law whenever the customer explains the use to which he intends to put the goods and relies upon the jeweler to supply him with items suitable for that purpose. If under those conditions the jeweler sells the customer merchandise without a brand or trade-mark, he is sure to be held responsible if the merchandise fails to suit the customer's purpose. When the goods sold under those conditions do not suit the customer's purpose, the law says that there is a "breach of warranty." In other words, the goods have failed to "come up to" the implied guaranty that they are suitable for the customer's needs. This would apply, for example, to wearing qualities under conditions explained by the customer, the ability of goods to resist climatic effects when worn under conditions incident to the cutomer's purpose, and similar situations of "fitness for a particular purpose."

It is possible too that the jeweler may be likewise liable where he sells a branded or trade-marked item under similar conditions. If a customer states that he wants a watch or other item that will withstand hard usage under certain described conditions, for example, and the jeweler sells him an "XYZ" item, the fact that the item has a brand or trade-mark will not necessarily relieve the jeweler of legal liability if it doesn't give the customer satisfaction on the job. The jeweler is relieved of legal responsibility only when the customer asks for the item *by its trade-name.* The point is that where a customer orders merchandise by trade-name, he is not relying upon the jeweler's skill or judgment, but upon the trade-marked merchandise.

From the jeweler's point of view, therefore, it is obviously the part of wisdom and safety to encourage customers to buy merchandise by trade-marks and trade-names. Such buying puts the jeweler "in the clear" so far as legal liability is concerned if the trade-marked goods turn out to be unfit for the customer's purpose. That this relief of the

jeweler from legal liability is of substantial value and importance, is emphasized by the fact that otherwise the law grants the disappointed customer a variety of ways in which he may seek redress against the hapless jeweler. Most important of all, perhaps, is the legal provision that the buyer, in addition to other legal remedies, may seek "special damages" where he can prove that they resulted from the failure of the merchandise to meet the requirements of the particular purpose. Conceivably, financial loss might be "special damages" resulting from the "failure" of a watch or other utility item, for example, under some circumstances.

Certainly there's a worth-while practical motive here for jewelers to encourage customers to ask for various items of merchandise by their trade-names. Jewelers appreciate, of course, that the featuring of trade-marks and trade-names in advertising, window displays and all forms of sales promotion, is sound and profitable merchandising; but so far few of them have realized that there is strong legal reason as well as a powerful merchandising and profit motive in promoting trade-marked merchandise. In a very real sense, the trade-name on an item of a jeweler's stock is a worth-while legal protection to the jeweler, provided his customers are educated and prompted to ask for goods by their trade-names. This is true not only in those states where the Uniform Sales Act is in effect but in practically all other states, for the law on this point is almost universal throughout the U. S.

Of course, no jeweler who expects to stay in business and develop good will seeks to avoid reasonable complaints and adjustments on merchandise. Promoting the use of the trade-name in jewelry merchandising is not for the purpose of leaving dissatisfied customers without redress for reasonable complaints. The idea is to avoid costly and unreasonable suits, and against those the selling of the jeweler's merchandise by trade-names is a saving precaution.

Why Do You Accept an Imitation When You Can Have the Original?

Flat pushers, anvils and self-centering pump pushers must be of highest precision to guarantee an exact work. SEITZ' reamers have a special shape in order to not wear out. The diameters are precise to a ¼/100 of mm and always 1/100 of mm smaller than the jewel. The SEITZ' reamer prepares a nicely perpendicular hole likewise one-hundredth smaller than the diameter of the jewel to be fixed.

A Modern Tool for a Modern Watchmaker!

Your Supplier Will Be Glad to Give You an Offer!

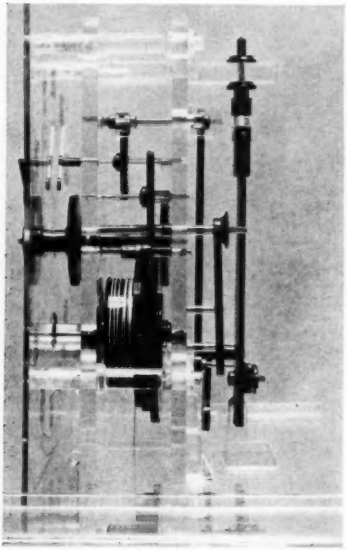
BERGEON & CO.

LE LOCLE, SWITZERLAND

German Ultra-Modern Clock Is Made Entirely of Plastics Except for Spring and Weights

By ALEXANDER BALL

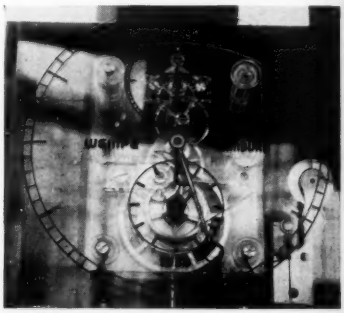
Since clockmakers progressed from wood to metal there hasn't been much change in materials but rather in stamping out parts for mass production rather than individually cutting. Recently, though, in Berlin, Germany, a "glass" clock was exhibited. Actually it was of a combination of synthetic resins, a formula known as "Plexiglas," which is transparent and hard enough for the gear wheels. Certain parts of the works are in colored plastics.



Side view of the plastic works in the all-plastic clock built by Hermann Unlauffd und Sohn. The darker portions of the works are not metal but opaque plastic, except for the still mainspring. The design of the clock is a grandmother clock in complete transparent case.

The plates between which the works is housed, the outside casing and even the screws are of colorless "Plexiglas," in the pendulum clock that was shown. The gear wheels and the anchor are of the same material, but in a yellow tint, while the shafts and numbers on the dial are of blue plastic.

The weight is of yellow "Plexiglas", but six kilograms of lead had to be inserted in the core. Except for the spring, this is the only metal used in the entire clock and the only substance but plastics aside from the cord from which the weight is suspended. The clock runs with surprising accuracy, and there has been no breakage in the machinery, despite the fact that the ratchet wheel of "Plexiglas" has teeth only 1 mm in height. The clock was made exclusively for show purposes by the Hamburg clockmakers Hermann Unlauffd und Sohn in cooperation with Kopperschmidt und Sohn, also of Hamburg. The latter made the dial and casing and supplied the "Plexiglas" for the works.



Face of the Wempe clock in plastic case, but with metal works. The maker is not averse to increasing the number of plastic parts.

Another plastic clock was shown at the same exhibition by the clockmaker, Wempe of Hamburg, and this one has been developed as a commercial venture for mass production on a small scale. The works of this clock are of brass and steel, but the plates and the whole housing as well as certain parts are of "Plexiglas". The transparency gives the clock a pleasing and extremely modern appearance expected to attract many purchasers.

Patronize Our Advertisers

Repair of Synchronous Clocks

(Continued from page 14)

for either 12 or 24-hour cycles. It likewise has a calendar control for cutting out the programs on certain days as well as external manual cut-out and momentary signaling switches. This instrument is self-contained in an attractively finished steel cabinet and can be utilized with either a single or dual motored clock system. As an adjunct to the multiple circuit program instrument, a cross-connection board with individual, circuit, or master push-buttons for individual signal control can be furnished in a Bakelite and steel cabinet to match the program instrument.

Timing devices of all types are also available. Tap bell timers to count seconds are widely used in hospital operating rooms. Sports timers for football, basketball, boxing, hockey, dog and horse racing and other sports are also in use. The range of timing devices utilizing Telechron Motors is almost unlimited.

The Telechron Motor has likewise become widely used in the industrial field wherein it is used by many manufacturers for either power or timing purposes. Among such household applications are furnace thermostats, stoker timers, time switches, gas and electric range timers, pre-set radio timers, etc. The use of motors in industrial devices is very widespread and covers practically every type of device in which time is a function.

In recognition of the genius and the pioneering efforts of Mr. Warren, the man who made electric timekeeping possible, the American Institute of Electrical Engineers awarded their highly prized Lamme Medal for 1934 to him "for outstanding contributions to the development of electric clocks and means for controlling central station frequencies." In addition, in the same year, the Franklin Institute of Philadelphia also awarded their notable John Price Wetherell medal "In consideration of his invention of the Telechron Motor."

U. H. A. of A. Technical Board Announces the Appointment of a New Member on This Board

G. J. Schlehr

Mr. George J. Schlehr, Dean of the Horological Department of the New York State School at Morrisville, New York, has recently been appointed to the National Technical Board.

Mr. Schlehr, we are sure, will be of great aid to the horologists throughout America—and especially in New York.

Shortly many of his articles will appear in this publication.

We must respect ourselves, to have others respect us.

SANDSTEEL CROSSCURVED MAINSPRINGS

Supply Constant Power for Millions of Watches in America

We Do Not Export—Our Total Production Is Reserved for American Horologists

Get Acquainted With Sandsteel Mainsprings! You Will Like Them When You Know Them. Supplied in 3,000 Sizes and Styles for American and Swiss Watches. Uniform Quality. Perfect Assortment.

Patented. Made in U.S.A. by

WATCH-MOTOR MAINSPRING CO., INC.

145 HUDSON STREET NEW YORK CITY

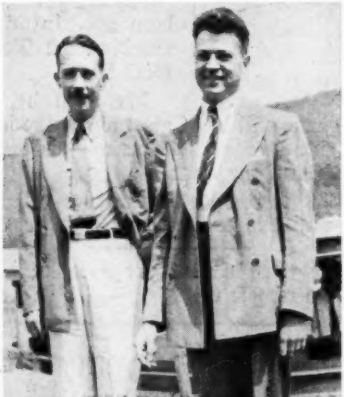
Write for Jobbers Names—Mention This Magazine

New York State Watchmakers' Association

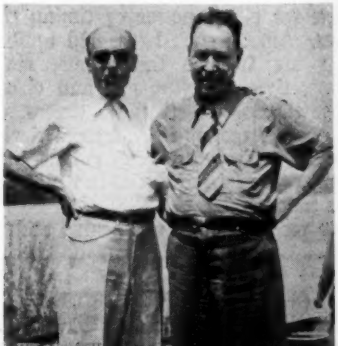
On July 31st, at Cooper Inn, Cooperstown, N. Y., delegates from the Horological Associations of Buffalo, Rochester, Utica, Elmira, Albany and New York City met at a conference and formed the "New York State Watchmakers' Association".

Officers elected until by-laws are ratified at a convention next year are: President, Miles E. Pooler; Vice President, A. Grohs; Secretary, R. A. Gutfrucht; Treasurer, O. J. Dilger; Board of Directors, M. E. Pooler, Horological Association of Rochester; J. L. Roehrich, New York Horological Society; A. Grohs, Buffalo Horological Association;

N. Y. Watchmakers' Delegates Relaxed Prior to Meeting



J. L. Roehrich, President of the Horological Society of New York, and Mr. Swartz



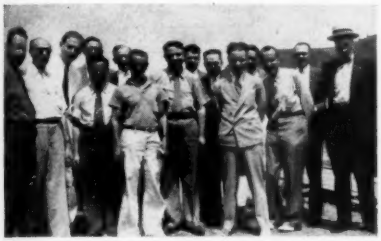
Mr. Sude and Mr. Kahn

H. B. Kahn, Watchmakers' Guild of Greater New York; L. B. Bevins, Utica Horological Society; J. DeVogel, Albany Watchmakers' Guild, and B. D. Smith of Southern Tier Horological Society.

A committee was appointed to draw up by-laws to be presented at the next convention to be held next year.

The question of license was discussed at length and marked progress was made in the plans for legislation to be presented to legislature this winter.

Much credit must be given to President Pooler for his untiring efforts to



Kahn, Sude, Orstagar, Grohs in back. Andy Grant in front. Harmon in back. H. Taylor in front. Martin Green, Schwartz, DeVogel, Bevins, Roehich in back. Schlehr, Pooler and R. G. Taylor

bring the conference about and at the close of the session he was given a rising vote of thanks.

From the enthusiasm shown by the delegates the newly formed association will go far in elevating the standards of the profession and eliminating the evils that infest our craft here in New York.

Thanks should go to Mr. R. G. Taylor for arranging the place of conference and the entertainment of the delegates, the 2-hour boat ride around Ostego lake viewing the historical sights was enjoyed by all.

R. A. GUTFRUCHT, *Secretary.*

Buffalo and Rochester Guilds

The Buffalo Association and the Rochester Association held a joint picnic on August 28th at Churchville County Park, and had about 200 participating in same.

R. A. GUTFRUCHT, *Secretary,*

He Is Not America's No. 1 Fisherman

Although not America's No. 1 fisherman, he is America's No. 1 horologist and annually takes up his rod and reel in relaxation. We refer to our National Technical Board Chairman, W. H. Samelius, who has returned from his pleasant vacation trip covering some 2500 miles; visiting Cleveland, Niagara Falls, Peterboro, Canada, Callandar, the home of the Dionne Quints, Kitchner, Ontario, Welland Canal, Detroit, Dearborn, Greenfield Village. We also learn that he incidentally landed a goodly number of Canada black bass. He now is preparing for a large enrollment in the Elgin College.

LANDAW BROTHERS
Watch Material and Jewelers' Supplies
406 Clark Building, Pittsburgh, Pa.

PERM-ENAM
TRADE MARK
The Original Dial Enamelizing

The Greatest Advance in Dial Refinishing in Years

Send us your watch dials to be refinished by our new PERM-ENAM process—The ENAMELIZING that is guaranteed. The black printing has the appearance of hard enamel, and you can rub or wash these dials with any liquid used by watchmakers without fear of removing same.

Sample and Price List Furnished Upon Request

P. J. BREIVOGEL
65 Nassau Street New York, N. Y.

Tennessee Watchmakers' and Jewelers, Association, Inc., Guild No. 1

R. F. Langreck

Guild No. 1, of Nashville, met August 2d. At this meeting new officers were elected. Ralph F. Langreck was elected president succeeding Earl W. Kidd. James A. Young was elected vice president, succeeding H. H. Harris, and Dee Osborne was re-elected secretary and treasurer. Board of Directors elected were: John B. Varalle, Earl W. Kidd, L. M. Osborne and E. H. Glenn. A copy of the Licensing Law was read by Mr. Coleman, after quite a discussion it was tabled until next meeting. We feel that the ground has been broken through and we are headed for something that will be of a great benefit to the watchmaker. It is our aim to get this in form so that it may be presented to the next legislature which meets in January, 1939. At this time we hope that it will become a law. A law that will raise the watchmaker above the standard that they have drifted to.

Guild No. 3, of Knoxville, elected new officers at the July meeting. R. E. Lucas was elected president, succeeding H. J. Wilson; J. N. Tindell was elected vice-president, and C. G. Clements was elected secretary treasurer, succeeding A. D. Jenkins, who by the way has just rounded out five years of faithful service as guild secretary. Board of Directors elected were: C. H. Jones, W. Otto DeMarcus, C. E. Bowman and R. M. Patton. Mr. B. A. Ruwe was elected a member of the State Board of Directors.

RALPH F. LANGRECK,
President Guild No. 1.

MARTIN GLUCK & SONS
Jewelers and Watchmakers Supplies
CLARK BUILDING
PITTSBURGH, PA.

IF YOU thought your eyes were going to fail, you probably would go to any necessary trouble to save them. Don't they deserve reasonable care while they are serving you? The truth is, that if you are using any loupe but the best, you are taxing your eyes with a burden that impairs their efficiency.

Finely-made, *precision* Bausch & Lomb loupes cost only 75c to $3.00. That isn't much to pay for years of visual efficiency.

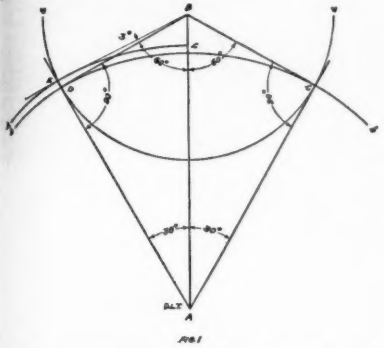
Your own jobber can supply you with B & L loupes. Or write for complete catalog of watchmakers' glasses, reading glasses and hand magnifiers.

BAUSCH & LOMB
OPTICAL COMPANY
260 BAUSCH ST. ROCHESTER, N. Y.

Laying Out and Drafting an Escapement

By D. L. THOMPSON,
Member National Technical Board UHAA

IN LAYING out and drafting an escapement we may take the center distance between the escape wheel and pallet arbors as a starting point, then all the other measurements can be calculated in parts of the center distance. Escapement measurements consist of both linear and angular distances and are mostly trigonometric functions. Angular measurements are made in degrees; a degree being divided into 60 minutes, and a minute into 60 seconds. A circle has an angular measurement or division of 360 degrees.



In this article we shall give only the results of the calculations necessary as they are applicable to all escapements of the design we shall consider. In Fig. 1 is given the preliminary lay out of an escapement. AB is the center distance. From B, as a center, and with a radius of one-half the center distance, the circle aa is drawn. Lines BC and BD are laid off at an angle of 60° to the right and to the left of AB and drawn as shown. From A, as a center, and with a radius of AD, a circle bb is drawn through the points C and D. The circle aa is called the locking circle and is the path followed by the pallet locking corners. The circle bb is called the primitive circle and is the path followed by the locking corners of the escape wheel teeth. Lines AC and AD are drawn from A, through the points C and D and form tangents to the locking circle aa. These lines form, also, the angles of 30° to the right and left of AB and the angles of 90° at C and D. C and D are the locking points of tooth and pallets and it will be noticed that the pressure of the tooth against the entrance pallet is directly towards the pallet arbor and on the exit pallet directly away from the pallet arbor, there being no tendency for the pallet to turn in either direction. The pallets are set, however, at an angle which forms an inclined plane in relation to the direction of pressure and this causes the drawing in action of the pallet towards the center of the wheel, to be explained later.

The lift that we can conveniently and practically give to the teeth will have to be considered before the outer diameter of the escape wheel can be determined. The lift may vary from, say, 2½° to 4° and the choice of lift is determined from the following conditions: The more lift a tooth is given the higher it becomes, i.e., the greater the wheel diameter, and therefore the less clearance it has for passing the lever at its arbor; with a short lift on the tooth the steeper the incline on the pallet will have to be in order to give the required pallet arc of movement, and this requires a stronger mainspring to give and maintain a good motion of the balance; with a 4° lift there is a moment when there is a parallel contact of the tooth and the impulse face of the exit pallet which allows the oil between them to cause a slight cohesion of them. (This effect may be seen by putting a drop of oil between two flat pieces of glass and noticing the effort required to pull or pry them directly apart.) With the 4° lift tooth there is first a sliding action of the locking corner of the tooth down the exit pallet incline until the tooth locking corner arives at or about the center of the

PEERLESS PRECISION LATHE

Chrome Plated

Length of bed, 11 inches.
Height, center to bed, 2 inches.
Swing, 4 inches.

W. W. STYLE CHUCKS

GUARANTEED ACCURATE and DURABLE

A Precision Lathe of high quality material and workmanship, built to last a lifetime. Finished in modern, non-tarnishing chromium. Chucks and attachments interchange with W. W. Lathes.

10 CHUCK COMBINATION

Worth Over $60

No. 39640. PEERLESS LATHE with tip-over "T" rest and 10 chuck combination—8 wire chucks, 1 taper chuck with taper, 1 screw chuck with six ¼" cement brasses. Complete with chuck box and leather belting..... **$49.50**

$4.95

A MONTH
FOR 10 MONTHS

LARGEST AND FOREMOST

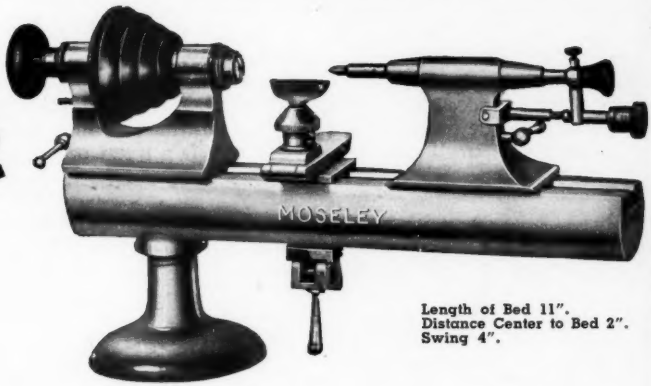
CHICAGO
Box 7737

DALLAS
DETROIT
LOS ANGELES
NEW ORLEANS
MILWAUKEE
MINNEAPOLIS

C. & E. MA
A GREATER VALU

Chrome Plated

GENUINE MOSELEY



Length of Bed 11".
Distance Center to Bed 2".
Swing 4".

Universally Recognized As One of the Finest Watchmakers' Lathes Manufactured

Fully chrome plated. Fitted with micrometer screw tail feed. Automatic lever lock which locks swing rest or slide rest to bed with a slight finger pressure.

10 CHUCK COMBINATION

No. 39412. Lathe complete with tailstock and swing rest, including taper chuck with center, screw chuck, six ¼" cement brasses, 8 wire chucks, belting and a chuck box with hinged cover and block for chucks..... **$67.50**

$6.75

A MONTH
FOR 10 MONTHS

REMOST HOUSE IN THE WORLD

MALL CO.
VALU GREATER SERVICE

CHICAGO
Box 7737

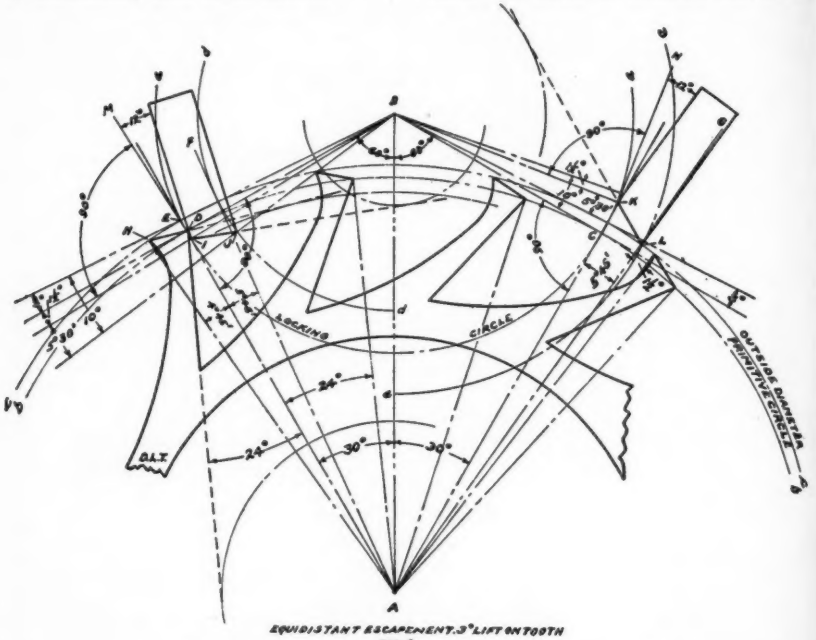
COLUMBUS
PITTSBURGH
HOUSTON

KANSAS CITY
OKLAHOMA
CITY

pallet, there is now a momentary parallel contact and immediately following this the turning of the wheel presents the heel of the tooth to the pallet which completes the rest of the impulse. As this action takes place 150 times per minute, any slight hesitancy in breaking the cohesive effect will have a bearing on the rate of the watch as it runs down. The cohesive effect is indeed small but, as you know, high-grade watches are made by eliminating such small defects.

tance DE is found to be .0262 (for an angle of 3°) of AB. Then AE, the radius of the circle cc, is equal to .866 plus .0262 which is .892 of the center distance AB, and twice this radius gives the total diameter of the wheel which is 1.78 of AB.

In laying out and drawing an escapement we shall not have to make any calculations but need only a set of drawing instruments, including a protractor, which is a metal or celluloid half-circle



EQUIDISTANT ESCAPEMENT. 3° LIFT ON TOOTH
FIG. 2

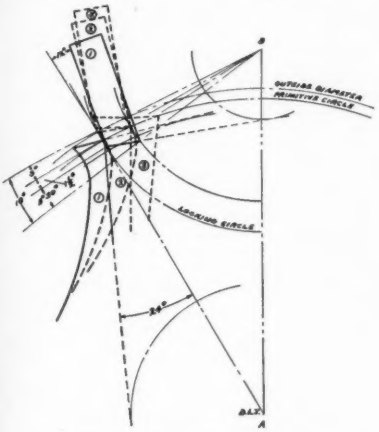
If we use an angle of 3° for lift of the tooth we will find that at no time do the inclines of tooth and pallet stand parallel to each other, so we have selected this lift for our drawing. Referring to Fig. 1 again, from B, as a center, an angle of 3° is marked off, as shown, and the line BE drawn. With A, as a center, and with a radius of AE, the circle cc is drawn which is the outer diameter of the escape wheel. The radius AD is found mathematically to be .866 of the center distance AB, and the

divided into degrees, and a drawing board. The drawing equipment may be purchased for as little as a dollar, for pencil drawings only, and there are various grades of instruments to be had for ink drawings, which are not expensive.

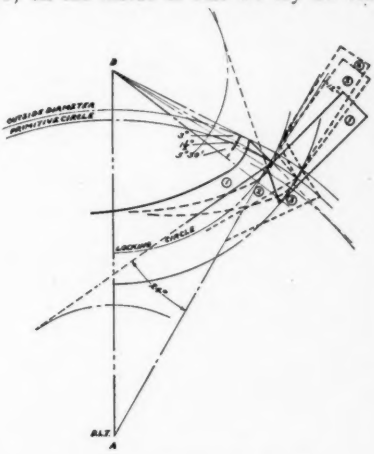
A drawing, to show details clearly, should always be made on a fairly large scale. If the reader will follow the instructions given herein he will have no difficulty in making drawings and will have a well defined idea of escapement

construction.

Fig. 2 is a development of the preliminary layout of Fig. 1. For the center distance AB we may choose, for our purpose, any distance convenient to our drawing board. We would suggest that this distance be made not less than 6 inches and somewhat longer if board space permits. The development of the drawing is as follows: From B, as a center, and with a radius of ½ the center distance you have chosen, draw the locking circle aa. From A, draw lines AC and AD tangent to the circle aa. These lines will form angles of 30° to the right and left of center line AB. From B, draw lines BC and BD. These lines will form angles of 60° to the right and left of AB, and will form angles of 90° at C and D. From A, as a center, and with AD as a radius, draw circle bb through points C and D. This is called the primitive circle. The points C and D are also the points of intersection of circles aa and bb and are the locking points of tooth and pallets. Next measure the angular widths of tooth and pallet on the primitive circle bb. They together, including the angle necessary for drop, can occupy only 12° which is ½ the angular distance between two teeth. Deducting the 1½° allowance for drop there is left 10½° to be apportioned between pallet and tooth. Of these the pallet is usually given about 1° more than the tooth. In this drawing the pallets have been given 5° and 45′ and the tooth 4° and 45′. The width apportioned to the pallets is laid off to the right of the lines AC and AD as shown by lines AF and AG. The width apportioned to the tooth is laid off to the left of the line AD and is shown by the line AH. From B, as a center, lay off on the inside of the line BD the locking angle of 1½° and draw line BI; on the inside of line BI lay off the angle of 5° and 30′, for the lift of the pallet, and draw line BJ; then lay off the angle of 3° outside the line BD, for



EQUIDISTANT ESCAPEMENT. 3° LIFT ON TOOTH
FIG. 3



EQUIDISTANT ESCAPEMENT. 3° LIFT ON TOOTH
FIG. 4

The CAS-KER CO.
CINCINNATI, OHIO
Genuine Materials
FOR ALL
AMERICAN AND SWISS WATCHES
TOOLS AND SUPPLIES
formerly
THE AMERICAN SWISS WATCH & SUPPLY COMPANY

the lift of the tooth, and draw line BE. From A, as a center, draw circle cc through the intersection of lines AE and BE, which gives the circle of the outer diameter of the escape wheel. From B, as a center, draw circle dd through the intersection of line AF and the outer diameter circle cc, and then the circle ee through the intersection of line AG and the circle cc. Circles dd and ee are the paths in which the let-off corners of the pallets move, while the locking corners move in the circle aa. When a tooth is in locking on the entrance pallet, the locking corner D will be at the intersection of line BI and the locking circle aa, while its let-off corner will be at the intersection of line BJ and the circle dd. Draw the line IJ and this will form the incline for lift of the entering pallet.

At the moment the entrance pallet is in locking with the tooth, the let-off corner of the exit pallet must be at the intersection of the outer diameter circle cc and the line AG, while its locking corner K will be at the intersection of the locking circle aa and a line BK drawn from B and forming an angle of 8½° outside the line BC, this angle being the total tooth-pallet lift. Draw the line LK and this will form the incline of lift of the exit pallet. Lines projected from the entrance and the exit pallet impulse faces will form tangents to circles drawn from B, as a center, which are called impulse tangent circles.

It will be noticed that the corner D of the tooth has moved past the line AD, and through an angle of 12°, as compared to the position of the locking corner of the pallet, in order to limit, or lock, on the pallet. This is the correct way to draw it as we have calculated the widths of pallet and tooth to the right and left of the line AD and on the primitive circle bb where the locking corners of pallet and tooth will be in contact on unlocking. We make a mental allowance for the slight change in the position of the locking corner of the tooth in relation to the line AD rather than draw in other radius lines to show it, however, this could be done if we should wish to do so. From the locking corner of the tooth, point D, lay off an angle of 24° to the left of line AD, which gives the inclination of the front of the tooth. From A, as a center, draw the circle, as shown, tangent to the line projected from the front incline of the tooth. The front incline of the other teeth will, when projected, form tangents to this circle. From A, as a center, lay off angles of 24° to the right of line AD and draw radial lines to the primitive circle. This spaces off the other teeth of the wheel. The curve, or clearance, for the back of the tooth may be drawn as shown, or to suit the fancy of the designer.

When a tooth is in locking on the entrance pallet, its locking corner being always on the primitive circle bb its let-off corner must be somewhere on the outer diameter circle cc and in this case is at the intersection of the line AH and the circle cc. Draw line HD and this will form the incline for lift of the tooth. Project the line HD and, from A, as a center, draw a circle to which this projected line is tangent. This provides the means to draw the impulse face lines of the other teeth so as to have them all uniform.

SPECIAL CASH SALE
of the
Famous Black Forest
CUCKOO CLOCKS
Hand-Carved and Fully Guaranteed

No. 92—Height 10 inches—5 leaves — Cuckoos once every ¾-hour $2.70
No. 500—Same size—Strikes full and half hours..$4.80
No. 103—Same size—Same as above only with door and gong $6.30
No. 60—Height 12 inches—Same as above with door and gong $7.65
No. 50—Height 14 inches—Same style with door and gong $9.00
No. 70—Height 18 inches—Same style with door and gong $10.50
No. 104—Height 12 inches—Deer head with door and gong $7.50
No. 61—Height 14 inches—Deer head with door and gong $9.70
No. 215—Height 18 inches—Deer head with door and gong $12.00
When ordering enclose money order or check, for others and Mantel-piece, Wall, and Grandfather Clocks, also movements, ask for special catalogue.

FRANK KAUFFMANN, Importer
1485 3rd Ave., New York City

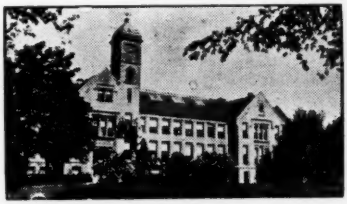
The angle of 12° above referred to, through which the tooth has passed to the right of line AD, is the angle of inclination given to the pallets in order to produce the draw which is necessary to hold them in locked position. This angle is drawn as follows: From points I and K draw perpendicular lines IM and KN to the lines BI and BK. These will form angles of 90°, as shown. From I and K, as centers, lay off an angle of 12° to the right of lines IM and KN for each pallet for draw. This gives the inclination of the locking sides of the pallets. Draw the rear sides of the pallets parallel and complete the rectangles which outline them.

Lines projected from the pallet impulse faces to the impulse tangent circles and lines projected from the tooth impulse faces to a tangent circle will give the means of representing the relative positions of the inclines of tooth and pallet at any stage of their passage across each other. In Figs. 3 and 4 we have shown the relative positions of tooth and pallet, by this means, using the same tooth lift as in Fig. 2. In position 1 the tooth and pallet are shown in full lock. In position 2 the let-off corner of the pallet is shown on the primitive circle and it will be seen that the locking corner of the tooth has acted as would a ratchet pointed tooth and that the impulse plane of the pallet has performed its full duty of moving the lever through an angle of 5° and 30′. In position 3 the let-off corner of the pallet is shown on the outside diameter circle and this shows that the impulse plane of the tooth has completed its portion (3°) of the total tooth-pallet impulse of 8½°. We can see that at no time do the inclines of tooth and pallet stand exactly parallel to each other but that the locking corner of the tooth first glides along the entire length of the incline of both the entrance and the exit pallets, and then the lift of the tooth is applied wholly at the let-off corner of the pallets.

The equidistant pallet escapement, which we have drawn, is used in the construction of the highest grade watches. The circular pallet ecsapement is a design that is not often met with but if the reader wishes to draw one there will be a change in the position of the pallets as follows: The width apportioned to the pallets is divided equally to the right and left of lines AC and AD, these lines passing through the center of the pallet impulse faces. The locking corners of the pallets will not, therefore, be equidistant from the pallet center and there will be two pallet path circles offset from each other the width of the pallet. The inclines of lift of both the entrance and exit pallets will, when projected as are the lines IJ and LK in Fig. 2, form tangents to a common impulse tangent circle.

There is another design of escapement which is used in the majority of our modern watches. This is a design which takes advantage of the practical qualities of both the equidistant pallet construction and the circular pallet one and gives a good action with less exactness of con-

"The Pathway to Success"



WATCHWORK
JEWELRY
STONE SETTING
ENGRAVING

Bradley Polytechnic Institute
School of Horology

DEPT. B PEORIA, ILL.

Established 1886

struction. This design is known as the semi-equidistant pallet construction, the pallet width being divided ⅓ to the left and ⅔ to the right of lines AC and AD, these lines passing through the pallet impulse faces and dividing them in that manner. The locking corners of the pallets will not be equidistant from the pallet center and there will be two pallet path circles offset from each other ⅔ the width of the pallet. The inclines of lift of the pallets will form tangents to individual impulse tangent circles but these circles will be closer together as compared with those of the equidistant pallet construction.

The other details entering into the drawing of an escapement should require no explanation and if the reader will get the fundamental principles well in mind the balance of their construction follows of its own accord.

We would suggest that those interested in making escapement drawings make one of each of the designs we have discused and, also, make drawings representing the relative positions of the inclines of tooth and pallets, as in Figs. 3 and 4, for each design and using tooth lifts of 2½°, 3°, and 4°. You will have, then, a visual means of comparing these designs.

Radio Clock Is Kept on Time by Signals Varying a Beam

It's time set and corrected by signals sent out from a master clock at the broadcasting station, a radio clock that can be installed as part of an ordinary radio receiver has just been patented. It tells time to the nearest five minutes, but can be modified to show correct time to the nearest second. Without interfering with the regular broadcast program, the clock is set by low-frequency modulations below the audible range. The signals cause reeds to vibrate, and reeds interrupt or let pass a light beam directed toward a screen. The position of the beam indicates the time.

SMARTLY DESIGNED—*Reasonably Priced!*

SELECTED FROM A VERY WIDE AND VARIED FALL SHOWING *of* **Wrist and Pocket Watches Gold and Chromium Plated Jeweled and Non-Jeweled**

WALES (7-Jewel)—6/0 size. "BEK" YELLOW GOLD plated case. Stainless chromium plated back—curved to fit the wrist. Metal dial with etched numerals and an unbreakable crystal. 7-jewel movement. Pigskin strap with gold plated buckle. Retail, **$5.95;** Keystone list, $8.16.

Your jobber can supply you promptly from the complete New Haven line of watches and clocks. Write us for catalog and trade discounts.

LADY JOAN—8/0 size. Chromium plated case with stainless back—curved to fit the wrist. Metal dial with black numerals and an unbreakable crystal. Choice of black leather strap or link bracelet. Retail, **$3.50;** Keystone list, $4.60.

NEW HAVEN Timepieces

Watch Division—

THE NEW HAVEN CLOCK CO., New Haven, Ct.

Rhode Island Horological Association

Leo J. Abisch

Less than four months ago, on April 19th, a small group of men assembled at the office of Mr. Leo J. Abisch, 67 Dorrance Street, one noontime for the purpose of founding ological Association. a Rhode Island Hor-The watchmakers present at that time displayed a great deal of enthusiasm and immediately set to work the wheels of an organization which has steadily grown during these months, both in members and achievements.

At that time it was voted to call the group the Rhode Island Horological Association, membership to be open to watchmakers and to persons working on instruments pertaining to time. It was also voted to hold the first full meeting of the Rhode Island Horological Association on April 21st at the Narragansett Hotel, at which time we would look forward to having Mr. Thomas J. Fagan, National President, address those present.

As you are aware, Mr. Fagan did come to our first meeting. And right here we want to express our appreciation of the cooperation he gave us at this time. After addressing the prospective members regarding the aims and objects of such a group, under his direction we set to work and elected a nominating committee after which the following officers were elected:

Leo J. Abisch, Providence, President; Emil L. Vaine, Woonsocket, First Vice President; Thomas Ornberg, Westerly, Second Vice President; Theodore E. Vaine, Providence, Secretary, and Armand O. Guertin, West Warwick, Treasurer.

Trustees: C. A. Pettingill, Providence; Domenic Micarelli, Providence, and Fred Pratt, Providence.

Executive Committee: J. H. Coutu, Providence; Arthur McLaughlin, Providence; Maurice E. Hebert, Providence, and Harold Guertin, Pawtucket.

At the close of this meeting we had received forty-three (43) paid applications. We might also mention here that this was the first time in the history of Rhode Island that so many watchmakers had been assembled together at one time.

At the June meeting, we had as our guest Colonel Wm. H. Bright, State President, with other members of the Massachusetts Horological Association. Colonel Bright gave a very interesting talk on how to combat the evils of price-cutting and unethical watch repairing.

Letters have been sent to the Chamber of Commerce and the Better Business Bureau explaining the evils which confront us in our state and ways and means to be devised to offset same. A bill is being drawn up at the present time to be presented, at the next session of our legislature, for licensing and registering watchmakers.

We are having a drawing to raise funds to advertise the National Insignia and to acquaint the public with the insignia.

Constitution and By-Laws have been duly drawn and approved by the members.

It has been the desire of our organization to become closely allied with the National Association. Four of our members were chosen to attend the United Horological Convention in Boston and Messers. Abisch, Vaine, McLaughlin and Gavin spent an enjoyable time in Boston, contacting members from all over the country and learning much from the interesting speakers and pleasant associations.

We feel that the organization is very fortunate in having such an active and dynamic person as Mr. Leo J. Abisch as its president. And it is due to his untiring efforts and continued enthusiasm that the group has grown to its present proportions (62 members) and has its present record of achievement.

We wish at this time to extend an invitation to all members in our vicinity

or those coming through our city to attend our meetings which will be held each third Thursday of the month at the Narragansett Hotel in Providence.

THEODORE E. VAINE, *Secretary.*

Master Watchmakers' Association of Colorado, Inc.

E. Peterson

The State Watchmakers held their Sixth State Convention August 14th, in Denver, Colorado, with a good attendance of 140 registrations.

During the morning session the regular business was speedily dispensed with. The major portion of deliberations was on Watchmakers' Legislation and Second-hand Watch Laws.

F. Babcock, President of H. I. A., and B. W. Heald, Vice President of U. H. A. of A. Both spoke on legislation.

Officers elected are as follows: President, E. Peterson, Denver; Secretary, O. R. Hagans, Denver; Treasurer, A. E. Beebee, Denver; State Trustee, D. E. Heigert, Denver. Vice Presidents: Henri Grusin, Littleton; Daniel C. Brown, Denver; A. J. Bradley, La Junta; Fred Weiss, Greeley; Fred Comstock, Boulder; G. P. Wilson, Colo. Springs; C. A. Watson, Pueblo; Jack Lehman, Ft. Morgan; O. D. Allen, Pueblo, and W. R. Clark, Florence. State Technical Director; Jes. I. Hansen, Denver. Assistant: William Eisch, Denver.

Mr. Peterson is now serving his third term, Mr. Beebee and Mr. Hagans are serving their seventh term.

The Association has pledged complete support to the Colorado Jewelers' Association. The two Associations will work

Master Watchmakers' Association of Colorado Banquet, Albany Hotel, Denver, Colorado

in harmony for the upliftment of our industry.

The association—at its inception six years ago—incorporated in its incorporation papers their objective "Watchmakers' Legislation," but up until last year had not attempted to press the issue. The State's bill will be presented at next regular legislative session.

During the meeting, *original transcriptions* from THE AMERICAN HOROLOGIST Recorded Library was used in order to bring before the groups the personal messages and views of Harrison

---

Watches that keep on running after being dropped several hundred feet have been perfected by a watchmaker in Switzerland. A Bern report says he has made a shock absorber which protects the balance wheel from injury. To test the timepiece several were dropped from an airplane, and all were keeping time as usual when retrieved.

Colorado Jewelers' Association, Inc.

Wolf C. Hansen

The Colorado Jewelers' Association held their State Convention August 14th in Denver, Colorado, with a splendid representation from all sections of the state.

The association for sometime has been extremely inactive. We feel such a reoccurrence of inactivity will be impossible since all new officers have been elected, including a well balanced board of directors composed of prominent and enthusiastic organization minded men and women.

The association lost no time in swinging into action and strongly favor all issues pertinent to those things to the state's best interest. The group was in favor of Watchmakers' Legislation and Second-Hand Watch Laws, and the board will assemble this week to take steps in this direction as well as other matters.

The new officers are: President, Wolf Hansen, Denver; Secretary and Treasurer, Orville R. Hagans, Denver. Vice Presidents: Frank Myers, Pueblo; Roy Utter, Greeley; Hazel Decker, Hotchkiss, and Lew Martin, Trinidad. Board of Directors: Al Long, Denver; Arthur Jacobson, Denver; K. C. Cosley, Denver; Wm. Schenkheim, Denver; H. H. Frumess, Denver; J. L. Molberg, Denver; Geo. E. Clegg, Denver, and Fred Weiss, Greeley.

This meeting was held during the State Watchmakers' Convention. By both associations meeting the same day a much larger crowd was possible and a joint banquet was held during the evening.

Prosperity is secured to a state, not by the acquisition of territory and riches, but by the encouragement of industry and the dissemination of virtuous principles.

War "Education" for Industry Near

Army Maps Program to 'Train' Private Factories in the Making of Munitions

The War Department is getting ready to spend $10,000,000 "educating" industry to produce war materials.

Congress authorized the expenditure over a five year period in an effort to gear the industrial machine closely to the military preparedness machine. The first $2,000,000 will be spent in the next twelve months.

Louis Johnson, Assistant Secretary of War, said today that the new program would be fully under way by Sept. 1.

The "educating" will be done by awarding small contracts for war supplies to firms which do not now produce them, but could by making slight changes in their plants.

A clock manufacturer, for instance, might receive an order for certain metal parts used in artillery range-finding instruments. The theory is that the manufacturer, through experience in producing the peace-time order, could begin production speedily in war time.

The Army's principal branches have been asked to report on what vital munitions will be most difficult to procure in the event of war, and these will guide a special board in distributing the orders among the factories. Unlike the army's usual purchases, the educational orders will be non-competitive.

The army's ordnance department has six arsenals producing and maintaining its guns and other equipment, and has contracts with a few commercial concerns for some finished and semi-finished materials.

The World War demonstrated, however, that modern conflict requires cooperation of all industry in fllling military orders. Specific tasks to be carried out in the event of another war have been assigned tentatively to about 10,000 plants.

Patronize Our Advertisers

Cincinnati Guild

The local Committee on Legislation is busily engaged in blazing the way to favorable legislation on the proposed Watchmakers' Licensing Bill. Cards are being distributed to all persons connected with the jewelry industry, soliciting their aid to bring to a successful issue the efforts for a betterment of not only the conditions surrounding the watchmakers' profession but the entire jewelry industry as well. The committee hopes that all persons engaged in any way within the jewelry field will wholeheartedly cooperate by filling out the cards and requesting others to do the same.

Cards may be had from Mr. Frank Foegler, 31 E. 4th St., or Harry Flotemersch, 501 Palace Theatre Bldg., Cincinnati, Ohio.

Member Elmer Fisher spent a part of his vacation at Indian Lake around the middle of July. Elmer forgot to measure the length of the big ones, so he had no fish stories to talk about.

Our genial friend, Walter Sturgis, is now located with the J. C. Hocket Jewelry Store in Mount Washington. Walter is a go-getter and we know that business will be looking up in that community.

The E. & J. Swigart Co. has issued a new catalog which will be appreciated by all watchmakers. Besides many illustrations of new and improved watchmakers' tools, it also contains valuable information on American watch models and mainspring charts for all American watches. All of the late models of Gruen, Bulova, Benrus and other well-known Swiss watches as well as a complete Main Spring Chart for these watches are included.

The wife and children of member Max Gregor are paying a visit to Germany, having left Wednesday, August 3rd. We hope they have an enjoyable time.

Dan Weir, material clerk at the E. & J. Swigart Co., spent two days of his vacation period in July at Mammoth Cave, Ky. Dan was very much pleased with his visit to this great natural wonder and recommends the trip to all his friends.

The Cincinnati Guild will hold their September meeting at the Cincinnati Observatory. They will be entertained with lectures on Astronomy and its relation to Time by Professors Yowele and Smith. The members will have the opportunity of observing the planets and stars through precision telescopes.

Member Frank Garrett is attending the National Convention of the Disabled Veterans of America at Grand Rapids, Mich. Frank is not only an enthusiastic member but is also connected with the drum corps.

Frank Foegler spent the week-end, August 13th-14th, at Pittsburgh visiting friends in that city.

Edw. P. Sohngen, junior partner of Vogelsang Jewelers, announces the arrival of a brand new baby boy at his home. Congratulations and best wishes for a bright and sunny future for the new citizen.

Our good friend and member, Elmer Kaising, spent his vacation in July at the most comfortable and practical place. At home. Elmer's favorite indoor sport is whitewashing cellars, etc., and otherwise beautifying the grounds around his palatial estate. When not engaged in these pleasant pursuits he could be seen sitting on his front porch thinking up ways and means to make the Cincinnati Guild a bigger and better organization.

The Cincinnati Guild elected Mr. Frank Foegler as an official representative to the Retail Jewelers' Tri-State Convention at Clifty Falls, Madison, Indiana, July 27th-28th. While there he brought before the delegates the proposition of the Watchmakers' Licensing Bill. The Kentucky and Indiana delegates were very much interested and requested all the information obtainable. The delegates from Ohio promised to forward to the Cincinnati Guild a written resolution favoring the provisions of this bill. This action is to be commended and we know it will be a great help to the Committee on Legislation.

Herbert Hueil, chairman of the Educational Committee, is busily engaged in making arrangements for the educational series for the Fall and Winter Season. Technical data via the stereopticon machine will again be continued at the October meeting.

The National Trustee for Ohio sends his greetings to the members in Ohio and kindly asks them to lend their best efforts in getting signatures on cards favoring the Watchmakers' Licensing Bill to be presented to the State Legislature at the January session of that body. As the success of this action is so vital to each individual member, it should not be necessary to remind them of the necessity of promptness and dispatch in doing the work now and not postponing to a later date.

JOSEPH A. H. VOSS,
News Editor, Cincinnati Guild.

An Unusual Sun Dial

By JASPER B. SINCLAIR

There is a sun dial in a public park near Chislehurst, Kent, that shows correct summer time only. The rest of the year it is one hour wrong. This strange sun dial was purposely built to do just that, for it is a lasting tribute to the man who first advocated the daylight-saving idea in England.

This sun dial, together with the park in which it stands, is a memorial to William Willett, England's pioneer in the matter of daylight saving. The wooded common known now as Pett's Wood was purchased by the people of Kent and made into a public park to honor the memory of Willett.

The sun dial bears this brief inscription: "This stone was erected by public subscription as a tribute to the memory of William Willett, the untiring advocate of Summer Time."

William Willett began his advocacy of daylight saving about nine years before it was first legalized in Great Britain. Throughout that time he carried on his campaign in its behalf, entirely at his own expense, meeting opposition and ridicule on all sides.

Again and again the Daylight Saving Bill was introduced in the House of Commons, only to be overwhelmingly rejected.

Finally, the Daylight Saving Act was passed on May 17, 1916—not because of Willett's persistent urging but rather as a war-time measure of economy. This Act remained in force until 1925, when the Summer Time Act was passed, which made the daylight saving system permanent in Great Britain.

Like many another pioneer, William Willett did not live to see the final achievement of his scheme. He died at Chislehurst, Kent, on March 4, 1915, just fourteen months before the passage of the act.

Today, almost a quarter of a century later, Britain still observes the daylight-saving scheme first advocated there by Willett. And if ever you chance to visit that corner of Kent, you will see the strange sun dial that correctly tells daylight-saving time only.

St. Paul Watchmaker's Guild

On Friday, August 19th, our guild held a meeting at the central Y. M. C. A., which was well attended. Discussion of future educational programs for our fall meetings was one of the major subjects.

Walter Keim, Harry W. Peterson and Karl G. Neid were instructed to prepare a short discussion on the lever escapement.

All members were urged to bring along questions and problems on this important subject.

Our next meeting will be September 16th.

KARL G. NEID, *Secy.*

BOWMAN Technical School
Courses for Success for WATCHMAKERS ENGRAVERS, JEWELERS
Write for free book "Your Future and Our School"
JOHN J. BOWMAN, Director
Bowman Bldg., Lancaster, Pa.

Book Reviews—The Horologist's Library

WE HAVE selected for review this month a volume entitled "Time Telling Through the Ages," by Mr. Harry C. Brearley.

The book was conceived by Robert H. Ingersoll & Bro. as a fitting memento of the twenty-fifth anniversary of their entrance into the watch industry, and is offered as a contribution to horological art and science.

The volume was prepared under the direction of the Brearley Service Organization, credit being due, also, to Mr. Walter D. Teague, the well-known artist of New York City, who acted as art editor and supervised the preparation of illustrations, typography and other art and mechanical features. The photographic compositions are the result of the enthusiasm, understanding and art of Mr. Lejaren a'Hiller, of New York City. In this connection the courtesy of Mr. Harry W. Kent, secretary of the Metropolitan Museum of Art, New York City, in permitting the use of collections of the museum in the preparation of illustrations, is to be commended.

The research work for the fact material was performed with devoted fidelity and discrimination by Mrs. Katherine Morrisey Dodge, who consulted libraries, trade publications, horological schools, and authorities in leading watch companies. The following were of great assistance to her: New York Public Library, New York City; Congressional Library, Washington, D. C.; Newark Public Library, Newark, New Jersey; The Jewelers' Circular, New York City; The Keystone Publishing Company, Philadelphia, Pennsylvania; Mr. John J. Bowman, Lancaster, Pennsylvania; Major Paul M. Chamberlain, Chicago, Illinois; The Hamilton Watch Company, Lancaster, Pennsylvania; Mr. Henry G. Abbott, of the Calculagraph Company, New York City, and others.

The volume is an epic history of the long struggle in the evolution of horology and a romantic history of man's quest for a perfect timekeeping mechanism. It includes a complete history of watchmaking in America and the material used in its preparation is written in a highly entertaining manner that is fascinating to the reader. The illustrations are delineations of the methods and mechanisms used in the recording of the passage of time and are printed in the roto-gravure style, the selections for the photographic illustrations being from one of the world's greatest collections.

There was only one impression of this book and it is now out of print, however, we have a limited number of copies which we are offering to our readers with the thought that the historical information it contains, regarding American wachmaking, will be greatly valued by American horologists.

In these short book reviews we try to give our readers an outline of the information contained in them but as this must be condensed to fit the space alloted we can make only a few random observations and give the table of contents.

The table of contents of this volume follows:

CHAPTER I. The Man Animal and Nature's Time Pieces.

CHAPTER II. The Land Between the Rivers.

CHAPTER III. How Man Began to Model After Nature.

CHAPTER IV. Telling Time by the "Water Thief".

CHAPTER V. How Father Time Got His Hour Glass.

CHAPTER VI. The Clocks Which Named Themselves.

CHAPTER VII. The Modern Clock and Its Creators.

CHAPTER VIII. The Watch That Was Hatched from The Nuremburg Egg.

CHAPTER IX. How a Mechanical Toy Became a Scientific Time Piece.

CHAPTER X. The "Worshipful Company" and English Watchmaking.

CHAPTER XI. What Happened in France and Switzerland.

CHAPTER XII. How an American Industry Came on Horseback.

CHAPTER XIII. America Learns to Make Watches.

CHAPTER XIV. Checkered History.

CHAPTER XV. "The Watch That Wound Forever."

CHAPTER XVI. "The Watch That Made The Dollar Famous."

CHAPTER XVII. Putting Fifty Million Watches Into Service.

CHAPTER XVIII. The End of the Journey.

APPENDIX A. How It Works. A description of a modern watch movement.

APPENDIX B. Bibliography. Giving the sources of the information contained in the volume.

APPENDIX C. American Watch Manufacturers. A chronological history.

APPENDIX D. Well-known Watch Collections. Compiled by Major Paul M. Chamberlain.

APPENDIX E. Encyclopedic Dictionary. Giving Horological and mechanical terms and short biographies of famous men who have contributed much to the advancement of horology.

There are 293 pages of text with 24 full-page illustrations and many smaller ones. The book may be obtained from the Book Department of the AMERICAN HOROLOGIST. Price, postpaid, $3.50.

A Difference of Opinion

Dear Sirs:

Re. "Capitol Clock With 170-Foot Hand Planned" in the August, 1938, issue of your fine publication.

The Foucault Pendulum will keep mean solar time only if suspended over the North Pole or the South Pole. (At the latter point it would run backward.) To find the hourly deviation at any other point on the surface of the earth it is necessary to multiply 15 degrees by the sine of the latitude.

The latitude of Atlanta being roughly 33.7 degrees my figures show that the pendulum at Atlanta will turn through only 8.3220 degrees per hour instead of the 15 degrees per hour necessary to indicate mean solar time.

Interesting as proof that the earth does turn about its axis as we have been told but as a time-keeper in Atlanta—not so good, captain, not so good.

I would like to take this opportunity to tell you that I enjoy your magazine very much. I think the two copies that I have seen are worth all you ask for a dozen.

Very truly yours,

HUGH M. OWENS.

New Literature

The Grobet File Corporation of America, 3 Park Place, New York City, have just issued a new catalog R-24 on Rotary Files, Hand Cut, Rasp Cut, Milled Cut, illustrating more than 200 different kinds.

Those desiring a copy of this should contact the company for same.

WORLD'S STANDARD FOR OVER A CENTURY

GENUINE AMERICAN WATCH MATERIAL SOLD EXCLUSIVELY

GENUINE SWISS WATCH MATERIAL SOLD EXCLUSIVELY

WITH FINISHED ENDS FOR ALL MODELS OF SWISS WATCHES ONLY
$2.50 DOZEN—$30.00 GROSS

Complete Stock of Jurgensen Main Springs with Unfinished Ends

Sole Agents BUHL, PEER & KEEFE 41-43 MAIDEN LANE NEW YORK CITY, N. Y.

An Ad Used In Rhode Island

TRY THIS ONE ON YOUR DICTIONARY

You'll find that Webster defines "horology" as the science or art of measuring time, or of constructing time-pieces. Here, at Foster's, we don't use the word "horology" very much. We are satisfied with being known as real good watchmakers.

However, it is an interesting fact that every one of our watchmaking staff, without exception, is a member of the United Horological Association of America, Inc. That means that we have pledged ourselves to maintain the highest standards of our craft.

In this advertisement we have reproduced the plaque of our association, the original of which is displayed in our window. This plaque is your assurance of a watch-repair service that is expert, honest and thorough. It is the guarantee of the men who actually work on your watch that you'll receive full measure of value for the money you spend.

FOSTERS—JEWELERS

Smiles are contagious, so are tears.

A Watch the Well-Dressed Giantess Would Wear

Imagine a dainty wrist watch weighing 3½ pounds! Just such a timepiece, a much enlarged replica of a diamond-set Elgin, will be on view in the Elgin exhibit at the National Credit Jeweler's Convention.

If the "gems" of this mammoth chronometer were real, each would weigh 500 karats. The "Grande Dame" who would wear it would tip the freight scales at little more than a ton. Her altitude would be a mere 96 feet. Her elegant little evening sandals would be in the fashionable size 90. And her petite hands would be garaged (probably with the aid of a traveling crane) in a neat size 117 glove.

Madame's waist would measure a perfect 40½, but you would have to measure in *feet*. Her little head, with its mop of curly baling wire—we mean "hair"—would look too divine in a tiny chapeau, size 444, no less and no more. Hose length would be something a little less than 13 yards.

And think of the charming scene when the fair owner of this mighty Elgin extended her arms some 95 feet, and wrapped them around the "boy friend", as he presented her with an engagement ring, size 99.

After all, it is not what is around us, but what is in us; not what we have, but what we are, that makes us really happy.—Geikie.

Cosley Jewelry Company

301 University Building, Denver, Colo.

Wholesale Dealers of

Jewelry, Tools and Jewelers' Supplies, Findings, Etc.
Seth Thomas Clocks, and Dresser Sets
Conklin Pens

Swiss Watches—Genuine Watch Materials for American and Swiss Watches

DO YOU KNOW?

Directed by
W. H. SAMELIUS, Chairman
Science of Horology and Technical Advisory Board

The Waltham Watch Company was recently presented with a collection of some 350 antique watches. There are some marvelous examples of reppose work, enamel work, besides many complicated watches such as repeaters, calendars, chronometers, anrd chronographs. Many of these watches have a colorful history. This collection was presented to the Waltham Watch Company by Franklin Dennison, a son of Aron Dennison, founder of the Waltham Watch Company and also founder of the Dennison Case Company of England. These watches are tagged and displayed in special cases in the reception room of the factory. The oldest watch in the collection was made about 1550.

A barrel makes .108000 revolution to each vibration of the balance.

Edward Barlowe of England (1675) invented the rack striking mechanism. The rack being placed between the plates until about 1700 instead of beneath the dial as in the usual construction today. Locking plates striking mechanism was used in the earliest striking clocks. Thus, in the 16th Century the striking train was practically the same as our clocks of today. The locking and warning arrangements then in use were similar to our present striking clocks.

Years ago the Howards made their own watch oil and sold it with the results they had to pay purchasers of their movements for cleaning the watches to which Howard oil was applied, due to the fact the oil did not prove satisfactory.

Isochronism: The word means "equal time" and is applied to a hairspring so adjusted as to cause the balance to which it is attached to travel through different arcs in equal time; in other words, the watch would keep correct time whether the balance turned through one-third of a revolution or a revolution and a half. In practical adjusting it is usual to adjust the hairspring so that the short arcs of vibration will be the quickest; this is done to compensate for thickening of the oil by the time and usage.

A Hamilton Watch engineer has worked out mathematically how much power is required to operate a standard Hamilton 21/0 size and his figures show us it takes ninety-six-hundredths of a billionth horsepower or for another comparison, the energy consumed by a 25 watt light bulb in one hour would run the tiny Hamilton movement for 4,000 years.

Since the beginning of the Horological Institute of America, May, 1921, the Certification Committee has granted 1332 Junior Watchmakers Certificates and 596 Certified Watchmakers Certificates. There were 196 that failed in the Junior test and 147 that failed in the certified watchmakers test.

The weight of the average 8 day seconds beat regulator drops approximately 8/10,000 inch for each beat of the pendulum.

Columbus Watchmakers' Guild

July 14th the Columbus Watchmakers' Guild held their annual picnic for the members, their families and friends.

The picnic this year was held at Glengary Park and a splendid time was had. Program consisted of eating, swimming, horseshoe pitching, baseball, etc. Our state president, Lee Luce, state secretary, Les Heimberger and many others, including the Guild secretary, were a pretty sore bunch of muscles for several days after the occasion.

We gave away a $40 Hamilton watch as first prize and several other prizes.

The Ladies' Auxiliary planned the whole affair. However, they do not operate their activities like the average watchmakers' guild. Every person present was assessed 23c for the expense of the occasion, and they ended up with a profit in their treasury of 19c.

We wish to state at this time every meeting night of the Guild the ladies meet in the same hotel and play bridge. This keeps the boys on the right side of the road and *it does* increase our attendance.

L. S. ALLEN, *Secretary.*

Sioux City Horological Guild

The Sioux City Horological Guild held its regular monthly business meeting at the Hotel Jackson, August 8th, with twenty-five members in attendance from a total membership of fifty-six. This guild, which became affiliated with the U. H. A. of A., April 26, 1938, has shown surprising interest and during this span of months now have a membership of fifty-six active members.

During this meeting a resolution was passed in regards to the display of the national plaque. An amendment was added to our by-laws, making it mandatory for every watchmaker or store who wishes to display this national insignia and to participate in our joint advertising to demonstrate before our Examining Committee his or her ability to repair watches properly. The committee is composed of H. C. Dugan, A. R. Herran and J. H. Greenburg.

In addition to these activities our organization is preparing a cooperative advertising campaign. Also working on state legislation, which we intend to put over at the very next session of our legislature.

All watchmakers in the state of Iowa should contact the Guild Secretary whose address is 508 Fifth Street, Sioux City.

C. M. HEWITT, *Secretary.*

The Horological Association of Virginia

The Horological Association of Virginia held a supper meeting August 3, 1938, at Brown's Restaurant, Norfolk, Va.

Six new members were added to the roll: M. F. McElrath of Blacksburg, Robert L. Barclay and Robert W. Page of Newport News, George C. Sears, Jr., David H. Anderson and H. C. Barker of Norfolk.

Applications for membership are coming in from all over the state and the secretary will send application blanks and information folders to any watchmaker or jeweler who will send in their name and address. Blanks and folders have been mailed to every jewelry store of which we have the address, but we have not been able to contact all the watchmakers and jewelers because we do not have their names and addresses, anyone interested in receiving information on the Association can secure it by writing to the Secretary.

The Legislative Committee has drafted a proposed Horology Law and already the Association has received very favorable comment from many watchmakers and jewelers in the state in regard to the proposed law. The Secretary will furnish any information pertaining to the Horology Law upon request.

The speaker of the evening was J. A. Beil who gave a lecture on the "Origin of Time".

Address all communications to Richard V. Bailey, Secretary, 200 Portlock Building, Norfolk, Va.

The Auxiliary to Guild No. 1, Tennessee

The Auxiliary to Guild No. 1, of the Tennessee Watchmakers and Jewelers, met Tuesday evening at the home of Mrs. J. E. Coleman. In the absence of President Mrs. Elmore Harper, Mrs. Coleman, vice president, presided over the business session. Mrs. Ralph Langreck, secretary and treasurer, gave reports of the last meeting. Plans were discussed for the Fall program.

Each member brought a covered dish and a buffet supper was served. A group of the Tennessee watchmakers and jewelers of Guild No. 1 who held their monthly meeting the same evening at the Hotel Noel were additional guests at supper.

Contests and games were included in the social hour. The next meeting will be held at the home of Mrs. J. L. Hooley on Highland Avenue.

MRS. RALPH LANGRECK,
Secretary-Treasurer.

New York To See Clock With 93 Dials

Sixteen-Foot Belgian Wonder Does A Lot More Than Tell Time of Day

Lazy clocks that merely tell time may hide their faces in embarrassment at the Belgian wonder clock brought to America.

Now being installed at the Museum of Science and Industry here, the sixteen-foot instrument tells time in leading cities of the world, what the sun and planets are doing, when high and low tides occur at principal ports and enough other assorted facts on its ninety-three dials to keep clockwatchers busy all day.

The clock has been brought to this country for exhibit by its maker, Lodewyk Zimmer, clockmaker to the King of Belgium.

—SCIENCE SERVICE.

Enamelized Dials

The desirability of a refinished painted or printed dial that could not be rubbed or dissolved off has long been the wish of every watchmaker and jeweler.

The one difficulty in dial refinishing has been the inability of dial refinishers to process a dial that would stand up under slightly adverse conditions. A drop of alcohol or benzine would ruin the most carefully refinished dial. The attempt to remove a slight finger mark or stain would smear the paint.

To correct this condition, P. J. Brevogel, has after considerable research, finally perfected an entirely new method of refinishing your printed dials. This will be known as PERM-ENAM, Trade Mark, The Original Dial Enamelizing

You can rub or wash these ENAMELIZED DIALS with any liquid used by watchmakers without fear of removing the black printing. The ENAMELIZING makes it extremely difficult to distinguish them from enameled dials.

We believe this to be the greatest advance in dial refinishing in years.

Like many other outstanding developments and achievements, this new process is being imitated (with very little success) by others.

Birds Sit on Town Clock Hands; Time Is Haywire

Bellefontaine, Ohio—The time here has gone haywire recently because flocks of starlings have been using the hands in the Logan county courthouse clock for a merry-go-round.

The birds use all four faces of the clock as a perch. Then, when the minute-hand starts its upswing, groups of them hop aboard and ride until a hand approaches the hour mark.

They then return to their perches and await another upswing.

The practice has kept the "clock doctor" busy each morning getting the hands back "on time."

Retail Jewelers Winning Recognition As Headquarters for Accurate Time

Now you become an authority for accurate time and science steps in to help the cause.

The engineering and research department of Henry Paulson & Co. have just completed a new instrument for complete time signals direct from the United States Naval Observatory at Washington. This station is the source of accurate time for the United States Navy and never before has an instrument been capable of picking up these exclusive time signals.

Now, with this new instrument, known as the Paulson Time Receiver, a machine licensed under patent applications and manufactured under RCA license as well, you can receive the same signals as the U. S. Naval ships all over the world, with unquestioned accuracy.

Now you know you have the right time. No guessing. In order to create enough power to bring in the signals from the U. S. Navy station at Washington, a specially constructed receiving set was necessary and at the same time it was important to have the lowest possible cost.

Two years have been spent in preparing this instrument, and we wish to thank the many jewelers as well as engineers and laboratories who helped our own department in perfecting this instrument.

You receive the time signals directly into your store and the instrument is built to bring in the U. S. Naval Observatory time signals only.

No other broadcast is received. These signals are received every hour beginning five minutes before the hour with a series of tone signals, ending with an accurate signal on the hour.

The instrument is in an attractive two tone walnut finished cabinet, size 8¾x 8½x6¾. Size excellent for use in a window or on show case or bench if desired. It requires very little room.

The Paulson Co. have also constructed a special aerial which they ask to be used with their machine, or your own aerial is satisfactory if properly built and connected.

The instrument sells to the retail jeweler, complete ready to use, for $39.50, with $1.00 extra for the special aerial.

For further information write to Henry Paulson & Co., sole distributors, 37 So. Wabash, Chicago. This is just one of the many interesting items and sales builders shown in the new Paulson Voice of the Retail Jeweler recently mailed.

If you did not receive your copy, the Paulson Co. will be glad to mail one free, postage paid.

Use Proper Tools

When your customer's bracelet no longer closes, making the necessary repair is a simple task with the Buckle Denting Plier No. 1640B. Distributed by M. J. Lampert & Sons, this unique instrument is available at leading material jobbers throughout the United States. It makes a new indentation on the side of the buckle in one operation—and then the lock closes securely. This plier, currently, is one of the many jewelers' and watchmakers' aids nationally distributed by the New York firm, in addition to a complete line of first-quality supplies.

C. & E. Marshall Co. Establishes a Junior Board of Directors

The following represents a letter by E. E. Marshall, president, addressed to

the employees of the company describing the plan.

"The C. E. Marshall Co. with headquarters at Chicago, Illinois, was organized over thirty years ago at Columbus, Ohio, by E. E., C. L. and J. K. Marshall, who with the help of an almost constantly increasing group of employes have made steady progress, and at the present time is the largest, as well as the most progressive and democratic organization in its field. The company in recent years has established branches in principal cities throughout the United States and manufactures an increasing number of products which are distributed through its organization.

"The Senior Board of Directors recently established a Junior Board of Directors with the object of giving the employes of the company a better opportunity to present their opinions and views in the management of the business. The original members of the Junior Board of Directors are as follows: C. E. Aschoff, G. J. Brauer, J. A. Britton, M. C. Campbell, J. F. Cromar, Edwin Ellefsen, Harry Leviton, A. L. Marshall, S. W. Prague and Robert Rodger.

"The Junior Board of Directors is governed by a set of by-laws and is self managed. The by-laws provide that elections be held semi-annually and that at least two new members who have not served during the preceding term be elected replacing the same number of present members of the board. The object of this system of rotation is to keep the road to opportunity open to all employes, and to inject new blocd and new ideas into the business. Recommendations of the Junior Board must be approved by the Senior Board to be effective. However, experience has proven that such recommendations are accepted in almost every instance.

"All promotions are made on a merit basis, and whenever possible, from within the organization. Any person dismissed for any reason may present his case before the Junior Board, whose recommendations will be accepted, the status of an employe being governed by a group instead of an individual.

"All employes are encouraged to offer suggestions for the betterment of our service to our customers and for the welfare of our employes, and rewards are made for outstanding suggestions accepted. Suggestions may be made through an immediate superior or direct to any member of either board of directors or any officer of the company. An open door policy is maintained by all executives at all times.

"The purpose of this dual management plan is to give a larger number of employes a greater voice in the management of the company, and should act as an incentive to all employees to ever increase the quality and scope of our service and products.

"The door to progress and opportunity must be kept open at all times."

Four Kinds of Jewelers

Swartchild and Company, in advertising their new Triumph Automatic Time Switch, stress some very important facts concerning "four kinds of jewelers."

No. 1 keeps his window lights "on" All Night Long. He realizes the importance of a well-lighted window, but overlooks the costly extravagance of keeping his lights "on" after the last window shopper has passed his store.

No. 2 turns his lights "off" when he leaves the store. He does not benefit by the potential advertising a well-lighted window produces and loses many a sale.

No. 3 keeps his light "on" each night after he leaves the store. He has figured out the extravagance of keeping them "on" all night long, so each evening between 11 and 12 o'clock he returns to his store to "put out" the lights. The result is that he spends many an interrupted evening with his late "trip to the store" ever pre-occupying his mind.

No. 4 keeps his lights "on" when he

(Continued on page 45)

Friction Jeweling

A NEW tool or a new process in repairing watches have seldom been the cause of so complete a revolution in work as Friction Jeweling was. Today friction jeweling is known in all countries throughout the world, and practiced by all progressive watchmakers.

The first friction jeweling tool with an assortment of friction jewels was created by Mr. Pierre Seitz at les Bre-

nets, Switzerland. Four years have passed since. Today Seitz is still the leading friction jeweling outfit. May we remember that the outfit consists of the friction tool with its set of pushers and anvils, the set of specially manufactured smoothing-broaches (reamers), the set of self-centering pushers and the different assortments of friction jewels. We have to point out that the friction jeweling tool Seitz permits to effectuate the process of reaming and pressing with the same tool as the two handles for the broaches and the pushers are interchangeable. Each pressing tool is provided with a micrometer screw. A division of it is always 1/100th of mm. The Seitz friction outfit has a complete set of pushers corresponding exactly to the standard diameters of jewels in the assortments.

The new set of self-centering pushers delivered now with the tool also marks a considerable step forward. When the watchmaker has to test the end-shake of the arbor in order to press the jewel to the proper depth, these special pushers will automatically center on the jewel and avoid damaging the surface of the jewel or the bridge. A few words will do to explain the principle of friction jeweling: The previous hole or the old setting determine the size of the smoothing-broach which is selected only so much bigger as it is absolutely necessary. By the reamer it is invariably given the diameter of the jewel as it is always 1/100th of mm smaller than the jewel. There are no other difficulties whatever in friction jeweling.

We know many watchmakers who think that the process of friction jeweling is only available with new watches provided with friction jewels. These new watches being still rather seldom in repair today, they think they can do without this tool. If the job of the Seitz tool would be restricted to the occasional replacing of jewels in new watches already provided with friction jewels, there would be no universal demand. It must be clearly said that the friction jeweling tool today gives the best job in the repair of set jewels. Friction jewels are also often used in watches without jewels and in small clocks.

To consider the development of Seitz friction jeweling one must acknowledge that the pioneer of this progress is not only an excellent expert of the jewel industry, but that he knows perfectly well the necessity and wishes of the practical watchmaker.

The three assortments of Seitz friction jewels now on market allow the repairing of all existent watches. The two new assortments "Convex balance olive hole" and "center-jewels" have been the result of a sort of vote between the

watchmakers in Europe and the New World. The Seitz assortments are a

jewel stock for modest expenses and in the same time the first step in the necessary way of form in watch material.

"Elginium" and "Beryl-X" Are Latest Elgin Contributions to Watchmaking Progress

All the new Elgin 15/0 watches now on exhibit are equipped with the new self-compensating "Elginium" hairsprings and "Beryl-X" solid balances.

Elginium is a special alloy—protected by registered trade marks. It is ideally suited for use with Elgin's unique self-compensating Beryl-X balance.

The Beryl-X solid balance is made from a heat-treatable alloy, which combines the characteristics of distortion-resistance, stiffness, and wear-resistance that are required of an exceptional balance.

Elgin test have shown that where an Elginium hairspring and Beryl-X balance are used together, either part may be replaced without altering the temperature adjustment of the watch, because neither Elginium nor Beryl-X are appreciably affected by temperature variation. Other tests have proved that magnetism has little or no effect on Elginium and Beryl-X, separately or in combination. And neither alloy will rust.

Four Kinds of Jewelers

(Continued from page 43)

leaves . . . gets full value from his window display even to the last passer-by . . . knows his lights will be put "out" at a pre-determined hour without his return . . . and saves on the electric bill.

They point out that the No. 4 jeweler derives all his benefits from the installation of an automatic time switch. For full details turn to Swartchild's full page ad, back cover of this issue.

SPECIAL NOTICES

Payable in advance.

Rates under all headings except "Situations Wanted," $1.50 for first 25 words. Additional words, 5c a word.

SITUATIONS WANTED, 75c for first 25 words. Additional words, 5c a word.

Heavy type, $2.50 for first 25 words. Additional words, 10c a word.

Name, address, initials and abbreviations count as words, and are charged for as part of the advertisement.

If answers are to be forwarded, postage must be enclosed.

Special notice forms close 30th of month.

Unless the advertiser instructs us to publish his name and address, all answers will be directed care THE AMERICAN HOROLOGIST.

SITUATION WANTED

Junior Watchmaker: Elgin trained, wishes to learn jewelry business. Wants work as assistant. Single, age 29, references furnished. Box 401 The American Horologist.

Apprentice Watchmaker: Elgin trained. Seeks permanent position with someone who will further instruct in finer arts of the craft. Box 402 The American Horologist.

CLOCK DIAL REFINISHING

We specialize in duplicating, restoring and refinishing clock dials of every description. Metal, Wood, Glass, Porcelain, Antique or Modern. Glass Paintings for Early American Clocks. Send for Price List

Est. 1924

EDWIN B. BURT COMPANY

6 Loring St. Auburndale, Mass.

Nu Vigor

TRADE MARK

MAINSPRINGS

Completely guaranteed to be superior in every way

- **Finest grade steel**
- **Accurately gauged**
- **Uniformly tempered**

Watchmakers, in increasing numbers everywhere, are using Nu Vigor MAINSPRINGS for all Swiss and American Watches because of their exceptional quality. Uniformity in temper insures accurate time-keeping without loss of resiliency during the life of the spring. Their consistent performance is not affected by temperature or climatic conditions.

The bevelled end piece on the Nu Vigor Swiss MAINSPRING anchors to the barrel hook without bending or filing.

Nu Vigor MAINSPRINGS are packed in individual moisture-proof envelopes. All models for Bulova, Gruen, Longines, etc. are clearly indicated on the envelopes.

Sold thru Jobbers only

B. JADOW INC. NEW YORK

Sole Importers and Distributors

41-43 MAIDEN LANE

D'ARCY OILS and PRODUCTS

Oils for Watches — Clocks . . . Chronometers
Bracelets - Baguettes — Electric, French, and others

"STRONGHOLD" Watch Crystal Cement
D'ARCY Dial Cleaning Solution
D'ARCY "CAPS" Watch Cleaning Compound

VOICE OF THE RETAILER

VOL. 3 — NO. 3

THE VOICE OF THE RETAILER

LIVE WIRES

TO-DAY'S GREATEST BUSINESS PROMOTER FOR YOU

NO WATCH REPAIR DEPARTMENT is Complete Without it' pp. 102-103

"FINEST QUALITY at Half Price pp. 2-3

Unequalled in Our 36 Years History

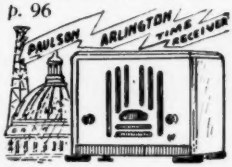
New Paulson Micro-Projector p. 22

LIVE POWER FOR YOUR STORE

SEE INDEX ON PAGE 6

NEW! IMPROVED CRYSTAL GRINDER

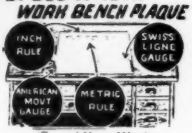
"You see how you Grind." p. 96



ACCURATE TIME Direct to your Store from: U S Naval Observatory p. 104

'KING' OF ALL WATCH CLEANING MACHINES

FREE! SPEED UP YOUR WORK BENCH PLAQUE



Speed Your Work Better light 4 See page 21

"CORNER FLANGES the Secret of its Greater Efficiency See page 8

FREE DID YOU GET YOUR COPY SENT FREE — POST PAID

FULL OF NEW BUSINESS-BUILDING IDEAS

AND MANY FREE HELPS FOR WATCHMAKERS AND JEWELERS

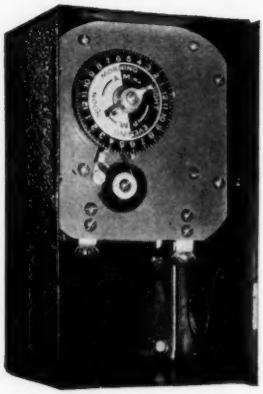
MODERN DEVICES TO BUILD YOUR BUSINESS

HENRY PAULSON & CO.

37 SO. WABASH AVE., CHICAGO, ILL.

TRIUMPH AUTOMATIC TIME SWITCH

Reg. U. S. Pat. Off. No. 352,715



Interior View

Advantages of the Triumph Time Switch

It provides full advertising value from your signs and windows even to the "last" passer-by. It saves electric current which would otherwise be consumed when no one passes your store. It can be used to govern heating and air conditioning systems, etc. Installed it becomes your faithful servant.

For GREATER ECONOMY

Specifications—

For Use on 110-125 Volt, 60 Cycle A. C.

This double pole, single throw switch, carries a load of 3000 watts on each pole at 125-250 volts. When used on a 2-wire 125 volt service the capacity of the switch is 30 amps. or approx. 3000 watts. When used on 250 volt 3-wire service the load is divided between the 2 poles and each pole carries a maximum of approx. 3000 watts or a total of 6000 watts. The motor is for use on 100-130 volts but a convenient neutral tap is supplied to permit switching a 250 volt line and at the same time furnishing only 125 volts to the motor. Minimum ON period 2½ hours; maximum 23 hours.

Exterior View

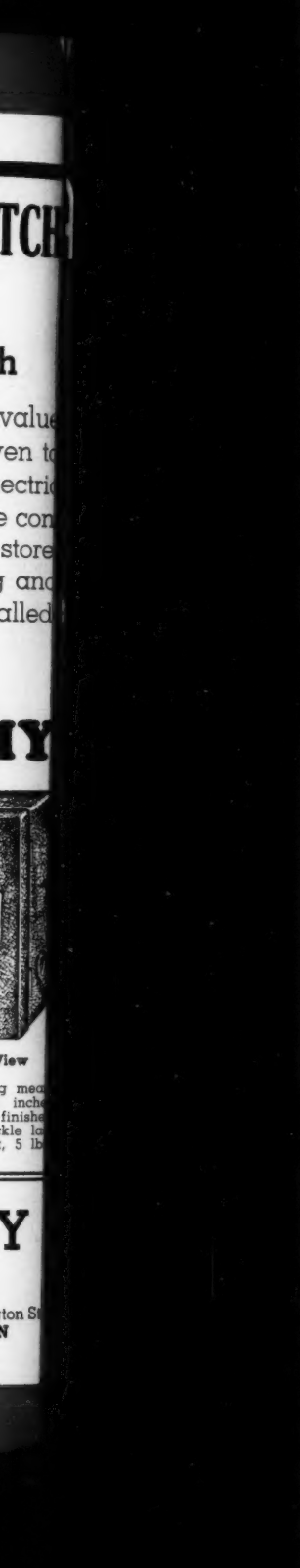
The housing measures 3¼x7x4 inches deep and is finished in black crackle lacquer. Weight, 5 lbs.

ONLY $1.15 PER MONTH

No. 567343. Triumph Time Switch, complete with installation data **$11.50**

(Or $1.15 per month for 10 months)

SWARTCHILD & COMPANY

World's Largest Watchmakers' and Jewelers' Supply House

29 E. Madison St.	31 West 47th St.	Santa Fe Bldg.	Volunteer Life Bldg.	387 Washington St
CHICAGO	**NEW YORK**	**DALLAS**	**ATLANTA**	**BOSTON**